

## AG to Muni Water Use

# AGRICULTURAL WATER TO MUNICIPAL USE

THE LEGAL AND INSTITUTIONAL CONTEXT FOR VOLUNTARY TRANSACTIONS IN ARIZONA

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### OVERVIEW

The development of water markets to facilitate the movement of water rights from agricultural to municipal and industrial use has been slower in Arizona than some expected. Several explanations for the lack of transfers have been offered in economics literature. This article reviews the institutional incentives for and barriers to voluntary water transfers in Arizona, focusing on the role of agricultural water supply organizations in the development of water markets. Survey results from a cross-section of agricultural water supply organizations in Arizona suggest that the impact of these institutions on water transfers can be significant in either promoting or impeding transfers depending on the specific circumstances. The sample size and response rates to questions do not lend themselves to definitive analysis, but qualitative analysis of the survey responses along with the statistical evidence provides insights into the critical ways irrigation districts can influence market response to pressures for water re-allocation.

### INTRODUCTION

In the semi-arid West, the combination of rapid population growth, a rise in manufacturing and services, increased environmental concerns, and the effects of possible climate change have brought about calls for a re-allocation of water from traditional agricultural use to meet new demands in other sectors. Both temporary transfers to meet intermittent drought and long-term transfers to address shifts in demand are needed.

Arizona is one of the fastest growing states in the US. Its population grew by nearly 1.5 million people between 1990 and 2000; 1.2 million of these new residents live in the Phoenix or Tucson metropolitan areas, or in the traditionally agricultural corridor between them. Currently, Arizona's population increases by about 195,000 people each year, raising statewide residential water demand by about 25,000 acre-feet (AF) annually.

The rapid and continuing growth in Arizona's urban population and complementary increase in manufacturing and service sectors have led to steadily increasing water demands and a search for additional supplies to meet them. The portion of Arizona's annual water use going to agriculture has decreased since its peak of 8 million AF in 1976, because of increases in water use efficiency, growth of urban areas on farmlands, and other reasons. Nonetheless, farming still accounts for roughly 75 percent of the water used each year in Arizona. Thus, water rights controlled by the agricultural sector represent the single largest potential source of water to fill growing municipal and industrial water needs.

Economic research has identified large potential gains from transfers of water out of agriculture to other sectors. Water commands substantially higher prices in urban uses. In one analysis of 2,154 water transfers between 1987 and 2005 in 12 Western states, study authors reported significantly higher prices for agriculture-to-urban trades compared to agriculture-to-agriculture trades — two to four times higher on average (see J. Brewer, R. Glennon, A. Ker and G. Libecap, University of Arizona, 2007). Because water can command much higher prices for urban uses than for irrigated agriculture, there are significant economic incentives for transferring water out of agriculture to cities.

Despite the disparity between the prices paid for water in agricultural and urban uses, agriculture-to-urban water markets have developed more slowly than some anticipated. Researchers have identified several reasons for the slow development of markets, the discussion centering around the properties of water that increase the cost of defining, enforcing, and transferring water rights. One factor that has received significantly less attention is the role of agricultural water supply organizations.

This article focuses on the role of agricultural water supply organizations in the development of water markets in Arizona. These organizations typically are corporate bodies governed by an elected board of directors and responsible for the distribution of water for irrigation to members, the maintenance of

Undeveloped  
Markets

Irrigation  
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### Survey

water distribution facilities, and appropriate record keeping. They have special powers authorized under state law in order to perform their functions which — depending on the organization — may include the power to incur debt for the purpose of constructing facilities, to assess and levy taxes, and the power to block transfers of water across the organization's boundaries.

A survey of agricultural water supply organizations was conducted to characterize their organizational features and assess receptiveness to efforts to transfer water from agriculture to other uses. The sample size is too small for definitive analyses, but qualitative analysis of the survey responses adds critical information to the picture of institutional barriers and incentives to development of water markets in Arizona.

To provide a context for the survey and analysis, we first examine the system of water rights and institutions that set the context of water transfers and provide a description of the various kinds of agricultural water supply organizations in Arizona. A very brief summary of recent water transfers is also provided.

### RIGHTS TO THE USE OF WATER AND LEGAL REQUIREMENTS FOR TRANSFER

## Water Transfers

Water in Arizona is owned by the state for the benefit of its citizens, but individuals may own the right to use water for a *beneficial* purpose. Water transfers are transactions that change the right to use water through sale, lease or other contractual arrangement. How water is transferred depends on the system of laws and institutions that governs the right to use the water. That system has been evolving in Arizona over more than a century, and the result is something of a patchwork. Different kinds of water are governed by different rules. Rather than generalize about water transfers in Arizona, it makes more sense to separately review the different legal definitions of water and the unique laws and institutions that apply to each type.

## Prior Appropriation

### Surface Water Rights

The Doctrine of Prior Appropriation governs surface water rights in Arizona. The essence, stated by the principle “first-in-time is first-in-right,” gives senior rights to the person who first uses the water of a stream for a beneficial purpose. Surface water rights in Arizona are *appurtenant* to the land; that is, rights to the water are conveyed with the land. Not only does the right attach to a specific plot of land where the water is used, it also is specific as to the point where water is *diverted* from the river or lake and the nature of the use.

## 1919 Water Code

Until 1919, appropriators could acquire a surface water right by posting a notice of intent to appropriate in the County Recorder's Office and subsequently diverting and using the water. In 1919, the Arizona Legislature enacted a comprehensive water code that required an appropriator to apply for a permit from the State Water Commissioner. Today, the Arizona Department of Water Resources (ADWR) administers the state's surface water rights permit system. Any change in the place or nature of use of surface water requires the approval of the Director of ADWR.

## “No Injury” Rule

The basic rule for transfers of surface water rights throughout the west is the “no injury rule.” A change in the place or nature of the Prior Appropriation-based right must not hurt any other water right holder on the river, even if the right is *junior*, or newer than the right to be transferred. Though seemingly fair and simple, this rule creates barriers to potential water transfers.

## “Sever and Transfer”

Arizona law allows surface water rights to be transferred to a different place and/or use through a process termed “*sever and transfer*.” To sever and transfer a surface water right the seller must file an application with ADWR. The department will give public notice of the filing and invite objections. The Director of ADWR (Director) determines that the water rights in question are valid (*perfected*) and that the water to be transferred will not exceed the amount of water *consumed* (actually taken out of the system, for example through evaporation or use by crops). Besides these basics, the criteria the Director uses in deciding on a sever and transfer application are whether the transfer: (1) conflicts with other vested rights; (2) is a menace to public safety; and 3) is contrary to the interest and welfare of the public.

## Limitations

Sever and transfer applications will specify the proposed changes to the perfected water rights. Any change that has the effect of increasing the amount of water consumed will be denied to prevent a net loss of water to the system. Changing the location or nature of the use is likely to have an impact on how much water seeps and flows back into the river, potentially reducing the amount of water available to downstream appropriators. If the transfer takes water completely out of the river system, the quantity to be transferred can be no more than the amount historically consumed. This amount is likely to be much less than the amount historically diverted. Calculating the amount that may be transferred can be problematic where information is lacking, and may involve costly and time consuming studies.

<b>AG to Muni Water Use</b>	<p>Appropriation rights involve a complex intersecting set of rights: every appropriator potentially has rights that are adverse or inconsistent with every other appropriator. The no injury rule gives every other rights holder on the entire river system standing to claim harm from a proposed transfer. ADWR has been reluctant to grant sever and transfer applications when there are objections from other rights holders. In addition, the public safety, interest and welfare criteria give the Director broad latitude in denying applications based on harm to third parties. The Director may consider impacts on the local economy, taxes, and related concerns that raise the political visibility of sever and transfer decisions. The degree of consensus needed to effect a major transfer of surface water rights significantly raises the transaction cost of such transfers.</p>
<b>Broad Latitude</b>	
<b>Three Categories</b>	<p><b>Colorado River Water Rights</b></p> <p>Rights to use Arizona’s allocation of Colorado River water fall into three broad categories: rights predating the Boulder Canyon Project Act of 1928 that were acknowledged by United States Supreme Court decree; so-called “Section 5” contracts with the US Bureau of Reclamation (Reclamation); and subcontracts from Section 5 contract holders — essentially, Central Arizona Project (CAP) subcontracts.</p>
<b>Reclamation Contracts</b>	<p>The US Supreme Court held in <i>Arizona v. California</i> that five Indian reservations located along the Colorado River mainstem have rights to 917,552 AF of Colorado River water from Arizona’s total 2.8 million AF allocation. In addition, the decree acknowledged preexisting surface water rights established mainly by irrigators along the Colorado’s mainstem.</p>
<b>Transfer Approval</b>	<p>The remainder of Arizona’s allocation is water allotted through contracts administered by Reclamation, including the contract with CAP for approximately 1.5 million AF of Colorado River water, which it distributes to subcontractors in central Arizona. The Boulder Canyon Project Act of 1928 federalized the administration of Colorado River water rights, requiring all users to enter into a contract with the Secretary of the Interior (through Reclamation). This requirement is assumed to include even those rights acquired before 1928, although this assumption remains judicially untested. Reclamation also administers the contract for Arizona’s CAP allocation. Other contracts provide water primarily for irrigated agriculture in Mojave, La Paz and Yuma Counties, although some water goes to municipalities such as Yuma and Bullhead City. For the Colorado River, pumping groundwater from within the defined <i>accounting surface</i> for the river aquifers is considered taking water from the river.</p>
<b>ADWR Role</b>	<p>Similar to other surface water rights, a Section 5 contract grants a perpetual right of use, with amount, place and nature of use specified in the contract. Transfers of rights to Colorado River water must obtain approval by the Secretary of the Interior in the form of a new contract.</p>
<b>Ownership Issues</b>	<p>In 1994, the Arizona Legislature gave the Director of ADWR a role in Colorado River water reallocation. For any proposed transfers of Colorado River water having a term of more than one year, Arizona law states that the parties to the transfer must have their new contractual arrangement reviewed by the Director before it is executed. The policy applies to all non-federal Arizona entities. The ADWR review is based on criteria similar to those applied to sever and transfer applications, with similar results. Transfers within an existing contract service area, however, are not governed by this policy.</p>
<b>CAP Water Rights</b>	<p>Although it is generally acknowledged that a contractual right to Colorado River water is a permanent entitlement, questions remain unresolved about what property interest, if any, owners of water contracts with Reclamation have in the water. [Reclamation ownership issues, see Glick, TWR #22] These questions touch any potential transfer of Colorado River water, greatly complicating the transfer process. On the other hand, Reclamation maintains records of all water diverted and consumed by Section 5 contract holders, making it easier to calculate the amount of water that might be transferred.</p>
<b>Excess Supplies</b>	<p><b>CAP Water “Rights”</b></p> <p>CAP water “rights” were acquired by subcontract from the Central Arizona Water Conservation District (CAWCD), also called simply the Central Arizona Project (CAP). The CAWCD is a special multi-county water conservation district created in 1971 to contract with the Secretary of the Interior. CAWCD is a municipal corporation with powers similar to other water districts in Arizona (see section on Water Districts). It entered into a master contract with the Secretary of the Interior and subcontracts with CAP users within its boundaries, which coincide with the boundaries of Maricopa, Pinal and Pima Counties.</p> <p>CAP provides water for agriculture in several different ways. Originally, irrigation districts were allocated CAP water under subcontracts, but taking the water proved prohibitively expensive. When the financial realities became clear, irrigation districts declined or relinquished subcontracts because of costs. Many of these same districts then purchased CAP water from excess supplies, that is, the water left unused by CAP water subcontractors in any year. Because subcontractors have allocations greater than current demands, large, though decreasing quantities are not used directly each year. CAP makes some</p>

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### *ag pool* Water

of this excess water, designated *ag pool* water, available to farmers at lower prices. The farmers who use this surplus water do not own a transferable right. Irrigation districts that waived their CAP allocations were offered alternative contracts for delivery of CAP water at more affordable rates for a ten-year term. Contracts are subject to availability of excess supply. Under Arizona's groundwater storage and recovery statutes, farmers also may receive CAP water from CAP subcontractors to substitute for their use of groundwater. (This arrangement will be discussed in more detail in the groundwater rights section.) Under this arrangement the farmers do not own a transferable right to CAP water.

Very little CAP water is allocated currently to irrigation districts through subcontracts. A few irrigation districts with CAP subcontracts transferred their rights to CAP water to other entities. McMicken Irrigation District transferred its CAP subcontract to the Cities of Surprise, Avondale, Goodyear and Peoria. Such transfers require approval from the Secretary of the Interior (through Reclamation) under advice from the Director of ADWR, as described above, and the parties are prohibited from profiting from transfers of CAP subcontracts. The McMicken transfers took five years from the original agreement through final approval.

### Rights to Effluent

### Effluent Attributes

Effluent is a legally distinct kind of water in Arizona. Effluent is the treated wastewater produced by a wastewater treatment plant and is owned by the entity that generates it. Once it is discharged into a river channel, however, it becomes surface water and subject to the Prior Appropriation Doctrine, with one major difference. The entity that generates the effluent is not obligated to continue its discharge. In other words, it may redirect the effluent to reuse or recharge and cease discharge, even if the change harms downstream appropriators. The effluent generator may use a natural channel for conveyance to a downstream user or for in-channel recharge. If effluent is conveyed for these purposes rather than merely discharged, it retains the legal character of effluent and is not appropriable. This is what the City of Phoenix did when it began piping some 70,000 AF of effluent from its treatment plant to the Palo Verde Nuclear Generating Station instead of discharging it into the Salt River. Downstream appropriators of irrigation water sued to compel Phoenix to continue discharging effluent into the riverbed (*Arizona Public Service Company v. Long* (1989)). The failure of their case (along with changes in state law) has enabled the formation of a market in effluent for which the legal and institutional barriers are relatively low (see TWR #46, Water Briefs).

### Market for Effluent

### Rights to Groundwater outside Active Management Areas

### Groundwater Use

Throughout most of its history, Arizona acknowledged the right of landowners to pump and use groundwater from under their land. The right was not limited, except by requirements that water must be used on the overlying land and the use must be *reasonable*.

The amount of water that a land owner may pump is not limited to prevent damage to neighbors, as long as the water is used on the overlying land. Any reasonable use of water is allowed, even if it has a negative impact on a neighbor's spring or groundwater well (see TWR #24, Water Briefs). Using water at any other location is permitted, but subjects the right holder to damage claims from neighbors.

Because the right of a landowner to use groundwater is not limited, there has been very little incentive for buying groundwater rights, except where the limits of the physical system require one use to cease to enable a different use. Two events changed the nature of incentives: passage of the 1980 Groundwater Management Act and construction of the CAP canal.

### Rights to Groundwater in Active Management Areas

### Groundwater Law Changes

After the passage of the Arizona Groundwater Management Act (GM Act) in 1980, groundwater law was entirely changed for large areas in the most populous regions of the state (Active Management Areas). AMAs roughly comprise groundwater basins around Prescott, Tucson, Phoenix, most of Pinal County, and Santa Cruz County (see map, page 13). Within AMAs, rights to use groundwater, except by small *exempt* well owners, are established by permit. The law governing groundwater use for irrigated agriculture in other specified areas (Irrigation Non-expansion Areas) also changed. INAs were formed around Douglas, Joseph City and the Harquahala Valley.

Changes in the law that imposed new limits on groundwater use in AMAs created incentives for purchasing and transporting water from groundwater basins outside into AMAs. Several cities purchased land for its appurtenant water rights (what were termed "water farms") in anticipation of future needs. Among these were Phoenix, Scottsdale, and Mesa. The City of Scottsdale made the only purchase of a farm for surface water rights and has had to keep the farm in agricultural production in order to avoid forfeiting those rights. A backlash of concern in rural Arizona that their futures would be curtailed and their

### "Water Farms"



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Water Use**

**Assured  
Water Supply**

**Grandfathered  
Irrigation  
Rights**

economies damaged by urban water farming led to the prohibition on water transfers into AMAs. In 1991, Arizona's Groundwater Transportation Act (GTA) removed the water farming option. Although the GTA prohibited the transfer of groundwater into AMAs, the GTA also grandfathered existing water farms, many of which have not yet been used.

When water farming was no longer an option, central and southern Arizona cities needed another mechanism to supply increasing needs for water. A new Assured Water Supply (AWS) program made permits to develop land dependent on a demonstration that there would be enough water to supply the needs of the development for 100 years. Some of this water had to be *renewable*, such as CAP water. The Central Arizona Groundwater Replenishment District (CAGRDR) was created to provide water suppliers and developers the means to meet the AWS program rules where they did not have access to CAP water or other renewable supplies. Membership in the CAGRDR allows members to substitute payment of CAGRDR fees for developing their own renewable supplies.

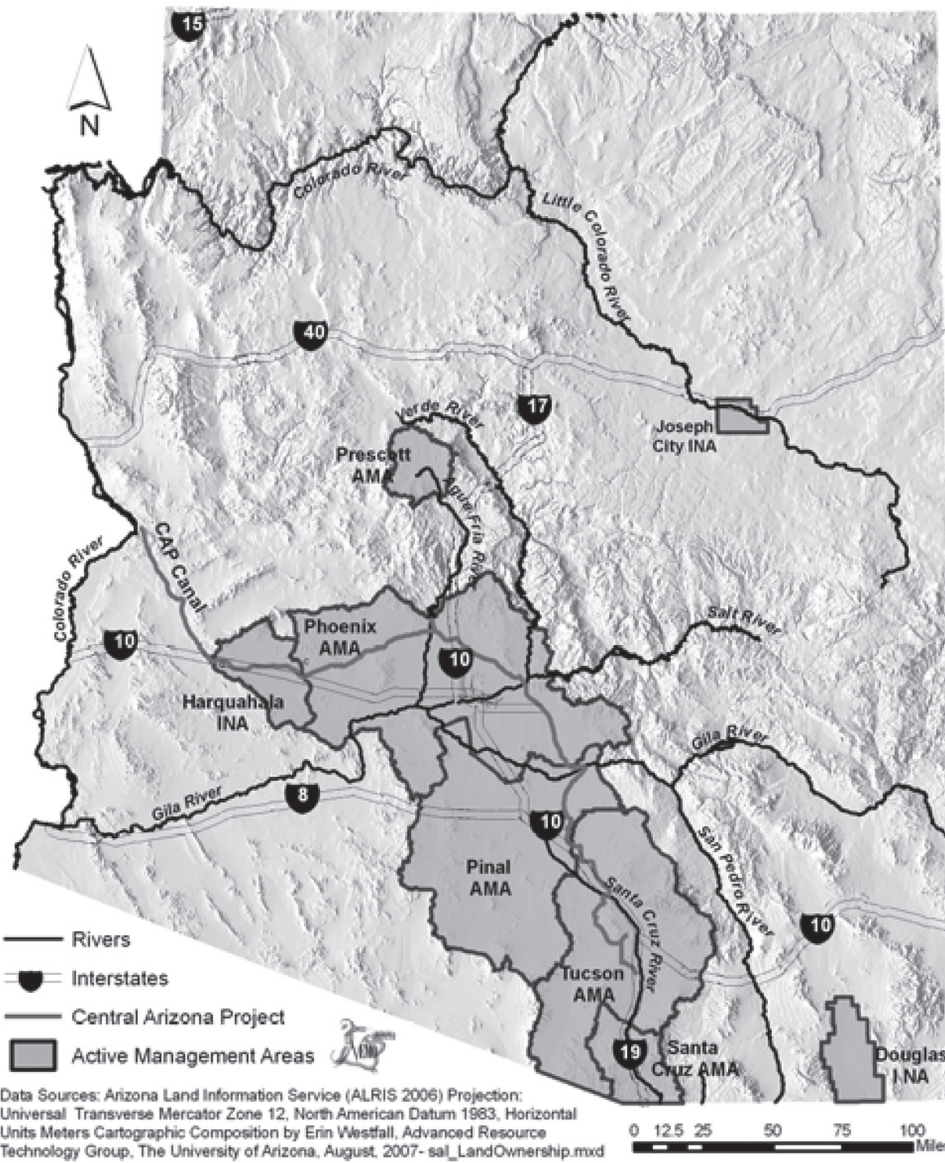
**Agricultural Rights to Groundwater in AMAs: Conversions and Credits**

Within AMAs, groundwater rights are defined and regulated. The rights of irrigators who used groundwater for agriculture before the 1980 law was enacted were "grandfathered;" that is, they were acknowledged as existing rights. Irrigators who had farmed lands from 1975 through 1979 were allotted a maximum annual quantity of groundwater based on their historic crop(s) and the maximum number of acres planted in any one year during the period 1975-1979. These rights were designated Irrigation Grandfathered Rights (IGFR). By chance, cropped acreages during this period were relatively high because of high commodity prices, yielding relatively large initial maximum IGFR allotments.

IGFRs are perpetual rights to pump groundwater for agricultural irrigation in AMAs, subject to a maximum limit. They are appurtenant to the land and can only be conveyed with the land. All IGFRs must be used on overlying land and can be used only for agricultural irrigation. The IGFR system was devised to permit agricultural operators to continue farming but prevent increases in the use of groundwater for agriculture.

If IGFR holders want to put their water to another use, they must first convert the IGFR to a Type 1 non-irrigation right. Once converted, the land associated with that right can never be returned to irrigation. Type 1 non-irrigation rights also are appurtenant to the land; they must be conveyed with the land and some restrictions limit the place of use. Type 1 rights are quantified; that is, the quantity of water that may be pumped annually is specified at the time of conversion. Converting an IGFR to a Type 1 right usually reduces the amount of groundwater that may be pumped (the change has generally ranged from approximately 3.3-5 AF/acre to 3 AF/acre). [Editor's Note: AF/acre refers to the volume of water in acre-feet per acre per irrigation year].

**Arizona Active Management Areas**



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### Groundwater Credits

### Exchange for CAP Water

### Credit Benefits

### District Control

### Districts Formation

### District Types

### Authorities

### Delivery Districts

Another type of quantified groundwater right defined by the 1980 GM Act was based on preexisting non-irrigation uses. A market for these more flexible Type 2 non-irrigation rights has developed.

Both IGFRs and Type 1 rights can be *extinguished* for groundwater credits. Groundwater credits represent an amount of water the credit holder is allowed to pump (Type 2 rights also can be extinguished for groundwater credits). Extinguishing a right to pump groundwater severs the water from the land and creates a right to pump a fixed quantity of groundwater from anywhere in the AMA, although some restrictions may apply. The amount of water that an entity is credited for extinguishing IGFRs or Type 1 rights is 1.5 AF/acre of land retired from irrigation in an AMA multiplied by the number of years between the date of extinguishment and 2025. After 2025, the multiplier is zero; in other words, it will no longer be possible to extinguish these rights for groundwater credits. The purpose for reducing the credit over time is to provide an incentive to extinguish the rights sooner rather than later.

Groundwater credits are also created when IGFR water is exchanged for CAP water in Groundwater Savings Facilities. Farmlands in AMAs that are irrigated with groundwater can receive CAP water purchased at a subsidized price from a CAP subcontractor. If the farmland is permitted by ADWR as a Groundwater Savings Facility, the subcontractor will earn groundwater credits equal to the amount of CAP water used, for the groundwater left in the ground. This arrangement allows irrigation districts to use CAP water they otherwise would not have been able to afford, and the subcontractor makes a return on a portion of its water allocation that would otherwise have gone unused. The Arizona Water Banking Authority also has stored water in Groundwater Savings Facilities.

Groundwater credits have qualities that encourage markets — they are portable, flexible and well-defined. Purchase of 10,000 AF of groundwater credits provides the right to pump a total of 10,000 AF of groundwater. For an AWS water portfolio, this translates to 100 AF of water annually for 100 years. Sales of groundwater credits are relatively common. In the Prescott AMA, where CAP water and the services of the CAGR are not available, developers are shopping for IGFRs to extinguish for groundwater credits.

## WATER DISTRICTS AND OTHER SUPPLIERS OF IRRIGATION WATER TO AGRICULTURE

The potential of agricultural water as a source for future municipal supplies will continue to motivate willing buyers and sellers to investigate transfers. Because agricultural water districts control much of the water used by agriculture, they will be parties to any significant transfers. The authority, structure and rules of these districts will have an impact on potential transfers.

In Arizona, agricultural water associations first formed in the 19th century to facilitate investment in water infrastructure, such as diversion dams and irrigation ditches. Many of these later reorganized themselves as districts under the laws of the state in order to contract for Reclamation project water. New districts were formed as projects were authorized, a number forming in the mid-twentieth century on the Lower Gila River. Later in the century, many new districts organized among groundwater users for the purpose of securing subcontracts for CAP water and to construct irrigation and drainage systems to receive CAP water. Other districts were formed among groundwater users for the purpose of obtaining energy for pumps at subsidized rates.

In Arizona, there are three kinds of agricultural water service organizations: (1) irrigation districts (also water conservation districts); (2) irrigation water delivery districts; and (3) agricultural water companies. Irrigation districts (and water conservation districts) may also be drainage districts, and if so, would have the word drainage in their name. All agricultural service organizations have geographical boundaries, defined in their charters, within which they operate. For our purposes, the general term irrigation district refers to any organization formed for the purpose of delivering irrigation water.

The first category of irrigation district is a political subdivision of the state, empowered as a *municipal corporation*, meaning the district has powers similar to incorporated towns. They can acquire water rights, buy and sell property, and carry out other activities and provide services as defined in the statutes that authorize them (ARS Title 48, Chapter 19; the category also includes some districts organized under Chapter 17). Some of their powers are governmental, including the power to assess and levy taxes, and use *eminent domain* (the power to condemn property for public purposes); although not all irrigation districts use these powers.

Although they are not municipal corporations, irrigation water delivery districts have very similar powers. In addition, they are specifically authorized to incur debts and contract with the federal government for irrigation services (ARS Title 48, Chapter 20). Many districts also govern the power supply in their service area.

Both kinds of districts are formed by petition of a majority of the landowners and controlled by



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Companies****Boards' Powers****Water  
Distribution****Water Rights  
Ownership**

an elected board of directors. They are financed by some combination of taxes and charges as set out in their charter, with taxes apportioned on a per acre basis. Boards of directors are elected according to the voting rules of the district. Most districts limit voting to owners of property that receives irrigation water and many districts weight votes according to the number of acres owned or the assessed value of the acreage. Arizona law provides that on petition by owners of not less than 51 percent of the total acreage in the district, the board may change from a "personal and individual" system of voting to an acreage system. Not surprisingly, relatively few district boards are elected on the principle of one person one vote by district residents.

Agricultural water companies are private corporations and associations. They may operate under a variety of names including water associations, canal companies, irrigation companies, and mutuals. Their boards are elected by shareholders. They have no power of eminent domain and cannot assess and levy taxes. They are financed by issuing stocks and bonds and through charges and fees for water service.

All district boards of directors control district operations and make decisions regarding management. A board's powers include the power to establish rules and regulations for the distribution and use of water within the district; to purchase or acquire water rights; to acquire or lease real estate; to lease, sell or otherwise dispose of real estate and personal property; to construct canals, ditches and other infrastructure for the distribution of water; and to provide for the construction, operation and management of electric power plants. Drainage districts have the authority to construct ditches and other infrastructure necessary for the proper drainage of land within the district. Day-to-day operations are usually managed by a manager or administrator.

Although the board of directors has the authority to establish rules for the distribution of water, state law requires that irrigation districts apply the Prior Appropriation Doctrine to the distribution of surface water and beyond that, on a *pro-rata* basis to the lands within the district. During times of shortage, the board may establish rules and regulations for cutting back the water delivered to members of the district, still applying the Prior Appropriation Doctrine to surface water.

The size of the board of directors varies from three to eleven, with smaller districts tending to have smaller boards. The statute authorizing irrigation water delivery districts specifies a three-member board.

Some districts legally own water rights on behalf of their members, who have contracted amounts of water delivered to them. In other cases, members retain their water rights and have water service contracts with the district. The actual water rights relationship between the district and its members is often left vague. Transfers among members have tended to be arranged informally to meet seasonal shortfalls. Among the powers of most irrigation district boards is the power to regulate water transfers within and across the boundaries of their district. In addition, district boards may veto the transfer of surface water rights anywhere upstream on the river system that provides their surface water.

**INTRODUCTION TO WATER TRANSACTIONS**

WATER TRANSACTIONS TAKE SEVERAL FORMS. THEY INCLUDE:

- **SALE OF WATER RIGHTS:** Change of ownership, including sever and transfer of existing water rights appurtenant to land. These are relatively rare in Arizona and most often occur between farmers in the same irrigation district. Other sales, such as sales of rights to effluent or credits granting a right to pump a certain amount of groundwater are more common.
- **LEASE OF WATER RIGHTS:** Temporary transfers for a specified period of time, frequently one year, although they can be for as long as 75 to 100 years. While leases are not as common in Arizona as they are in California, where mechanisms are in place to facilitate them, they have been used in response to special circumstances.
- **CONVERSION OF WATER RIGHTS:** A transfer that changes the nature of the water use but not the location. The term "*conversion*" applies, for example, when farmland is developed for housing and the water use changes from irrigation to domestic water supply. Conversions are a common form of water transfer where there is farmland on urban fringes.
- **EXCHANGE OF WATER RIGHTS:** The substitution of one water supply for another. Agricultural water supply organizations take part in several kinds of exchanges. Water exchanges may involve any of the types of water described previously and may be carried out under contract, permit, or notice of water exchange as specified in ARS 45-1002. Such exchanges are reported to ADWR, which maintains a water exchange registry. One of the most common exchanges occurs when groundwater is exchanged for CAP water in Groundwater Savings Facilities. The relinquishment of a CAP subcontract and purchase of CAP *ag pool* water may be considered an exchange as well, although only CAP water is involved.

**Sale****Lease****Conversion****Exchange**

## WATER TRANSACTIONS IN ARIZONA

**AG to Muni  
Water Use****Transactions  
Listing****Municipal  
Purchases****Surface Water  
Purchases****Enviro & Rec  
Transactions****Environmental  
Enhancement****Reclamation  
Contracts****Industrial Use****Conversion  
Into Limits**

The most comprehensive listings of transactions in water in the western US are compiled by the *Water Strategist*, published monthly by Stratecon, Inc. of Claremont, California. A review of listed water transactions in Arizona between 1995 and 2008 found few involving agricultural irrigation water. Only a handful for transactions, other than sales of Type 2 non-irrigation rights and reclaimed water (a special class of effluent), were reported.

As mentioned previously, McMicken Irrigation District, located in the rapidly urbanizing west valley in the Phoenix metro region, dissolved itself and sold its CAP water allocation to various municipalities between 1995 and 2000, specifically as conversion of use for lands within the District's boundaries. The Town of Marana purchased a 47 AF CAP subcontract allocation from the Cortaro-Marana Irrigation District. Other transactions that involved changing the use of water from agricultural irrigation to municipal supply include the purchase of Red Gap Ranch by the City of Flagstaff for its groundwater rights and purchases by the City of Prescott of land with groundwater rights in the Big Chino Valley. Both the Flagstaff and Prescott cases also required a change in the location of use and construction of infrastructure to effectuate the transfer.

Purchases of land with surface water rights have also resulted in movement of water from agriculture to municipal use. In 1999, the City of Prescott purchased 855 acres around Willow and Watson Lakes from the Chino Valley Irrigation District for associated surface water and storage rights. The Chino Valley Irrigation District's shareholders who followed their land received a larger per share payment than those who continued to irrigate. Prescott financed the transaction in part by the sale of its CAP subcontract rights. The new water was not intended for immediate use in the direct potable supply and in the short-term is used for irrigation, recharge and recreation. The City of Nogales also purchased land and appurtenant surface water rights in the Santa Cruz River for conversion of use to municipal supply.

Drought and the desire to protect environmental and recreational values motivated a group of transactions that substituted alternative water for reservoir diversions for irrigation. In 1999, the San Carlos Irrigation and Drainage District (SCIDD) was involved through the one-time lease of 2,000 AF of CAP water to Pinal County to maintain water levels in Picacho Reservoir. SCIDD also cooperated in a water exchange when CAWCD leased 16,775 acre-feet of CAP water to Reclamation for irrigation by the SCIDD and the Gila River Indian Community. The exchange prevented diversions from San Carlos Reservoir that would have brought the lake level dangerously low. Federal and state funding sources earmarked for environmental protection were used to finance the exchanges.

More recently, a pending transaction will ensure that a municipal "water farm" will be dedicated to preserving and enhancing habitat for native and endangered species. Planet Ranch, purchased by the City of Scottsdale in 1984 for its surface water rights in the Bill Williams River will be used for environmental enhancements under an agreement between Scottsdale and the Phelps Dodge Corporation and its successor, Freeport McMoRan Copper and Gold, Inc., provided the deal receives final approval.

Reclamation has continued to establish contracts for water from the Colorado River. Arizona State Lands Department acquired a permanent contract for water to irrigate state leased lands near the City of Yuma, and in 2003 and 2006 individual irrigators obtained contracts. Transfers of existing Section 5 contract water are rare, possibly because of institutional impediments. In the one case documented in the *Water Strategist*, the Mohave County Water Authority was formed to help the City of Kingman avoid forfeiture of its Colorado River entitlements when it sold those entitlements to Bullhead City, Lake Havasu City and the Mohave Valley Water Conservation District.

The Vidler Water Company converted approximately 6,500 AF of agricultural irrigation water to industrial use through its sale of land and associated water rights in the Harquahala Valley (Harquahala INA) to Allegheny Energy as cooling water for energy production. Vidler's later sale of land and water rights to Vanderbilt Farms did not affect the status or use of those rights. Vidler Water Company is not an agricultural water supply organization. It acquired water rights in the Harquahala Valley by purchasing farmland that it leases to farmers.

Unfortunately, the *Water Strategist* cannot be considered a comprehensive source of information on water transactions in Arizona for several reasons. Conversions are not captured when they occur within the boundaries of a district. Such conversions appear to be fairly common and routinely carried out as part of the responsibilities of district boards in areas, such as Mohave Valley, where agricultural land is being developed for residential and commercial use. In addition, the *Water Strategist* does not capture the exchanges of groundwater for CAP water in groundwater savings facilities, nor are sales of water credits recorded.



**AG to Muni  
Water Use**

**Groundwater  
Replenishment**

**Supply  
Organizations**

**Transaction  
Experience**

It is instructive to look at the CAGR (Central Arizona Groundwater Replenishment District) plans for acquiring replenishment supplies. The CAGR, which is responsible for offsetting groundwater pumping of its members through recharge in the CAP region, has a large and increasing replenishment obligation. The CAGR Plan of Operation contains an inventory of water supplies potentially available to fulfill this obligation over its 20-year planning horizon and beyond. In terms of their maximum acquisition volumes in AF per year, they anticipate the availability of 595,101 AF from Indian supplies, 205,507 AF from effluent, 181,000 AF from groundwater basins exempted from the prohibition against inter-basin transportation, and 177,919 AF from Section 5 contract holders. None is anticipated from other surface water or from non-Indian decreed rights on the Colorado. Considering the relatively large portion of Arizona's water use accounted for by agriculture (approximately 75 percent), the relatively small portion (approximately 15 percent) of the total inventory from water controlled by agricultural water supply organizations is worth noting.

**SURVEY RESULTS**

To assess the role of water supply organizations in facilitating or inhibiting water transfers in Arizona, data were collected from a statewide survey. Fifty-four surveys were mailed to Arizona's irrigation districts and other water supply organizations in 2005; thirty-one surveys were completed and returned. Five respondents were dropped from the sample because they were not involved with agricultural irrigation water (three are municipal water suppliers and two are electrical supply distributors), reducing the final sample size to twenty-six (see table). The survey gathered information about the governance structure, acreage, membership, and water sources of the districts. Respondents were also asked to describe their experience with water rights transactions, which were divided into three categories: *conversion* of use within district boundaries; *transfer* of location across district boundaries; or simply an *exchange* of one water supply for another. Other key questions attempted to assess the distribution of benefits from water transactions, gauge the level of government involvement with water transactions, and elicit the general sentiment of the district regarding water transfers.

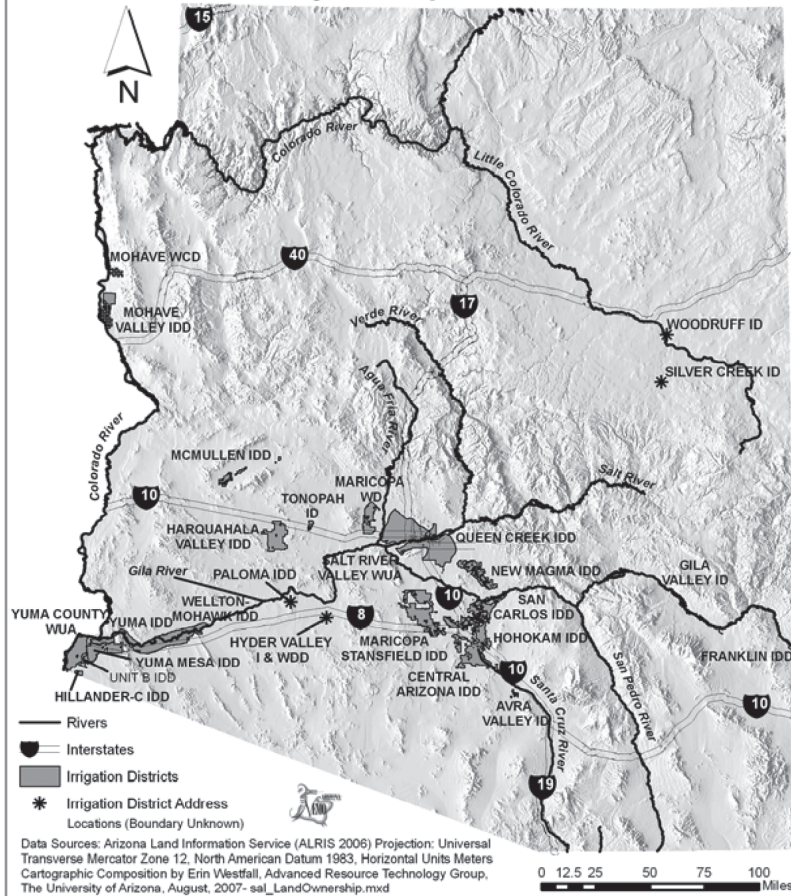
Boards of directors ranged in size from three to 11, with larger districts generally having larger boards. Roughly half of the board elections are weighted by acreage and only two districts extended voting rights to all the residents in the district. For roughly three-quarters of the organizations, a manager runs the day-to-day operations. The numbers of members vary significantly, from a low of five to a high of around 600,000. Similarly, total acreage varies from a low of less than 1,000 to a high approaching 250,000 acres.

Some districts have multiple sources of water. Groundwater rights are typically held by individual landowners. Surface water rights and rights to Colorado River water through Section 5 contracts, however, are usually controlled by the district, as is delivery of CAP water.

Statistical analysis of the survey results was limited by the small size of the survey and by other data issues. Respondents appeared to adopt different interpretations of the survey questions and some answers were inconsistent. However, the statistics generally bear out expectations. Larger districts were more likely to engage in transactions of any kind than small districts, possibly reflecting simply their greater potential in land and water. Water exchanges were more common for districts within AMAs and conversions were more common in urbanizing areas.

Conversions were more common than any other form of transfer and took place predominantly to accommodate the growth of residential and commercial development on the urban fringe. Whether a district is located in an AMA was not a factor in conversions. However, the conditioning factor does appear to be limitations on

**Arizona Irrigation Districts  
Survey Respondents**



**AG to Muni  
Water Use  
Board Policies**

groundwater rights. Conversions take place in AMAs, within the *accounting surface* of the Colorado River aquifer, and where physical conditions limit groundwater use. District boards in urbanizing areas have adopted policies to facilitate conversions within the district for the benefit of its members, including negotiating more flexible Section 5 contracts with Reclamation. The conversions from farmland to residential and commercial uses within the Salt River Project boundaries over the past 50 years have been substantial, from more than 200,000 acres of agricultural land in 1955 to only about 20,000 acres in 2005. The fact that control of the water supply remained unchanged by the conversions facilitated the process.

**Agricultural Water Supply Organization Survey Respondents**

Organization	Size acres	AMA	County	GW Right holder	SW Right holder	Section 5 contract	CAP contract	GSF	Voting	Board Members	Type of Transfer
Avra Valley ID	11,000	Tucson	Pima	individual <sup>1</sup>	no	no	no	no	weighted	3	none
Central Arizona IDD	87,000	Pinal	Pinal	individual <sup>1</sup>	no	no	district <sup>4</sup>	yes	weighted	9	conv/exch
Franklin IDD	8,000	no	Greenlee	n/a	individual <sup>2</sup>	no	no	no	owners	3	none
Gila Valley ID	32,512	no	Graham	n/a	individual <sup>2</sup>	no	no	no	owners	9	none
Harquahala Valley IDD	33,000	Phoenix	La Paz/ Maricopa	individual <sup>1</sup>	no	no	district <sup>4</sup>	no	owners	5	none
Hillander "C" ID	3,600	no	Yuma	individual	no	no	no	no	owners	3	none
Hohokam IDD	28,000	Pinal	Pinal	individual <sup>1</sup>	no	no	district <sup>4</sup>	yes	weighted	5	none
Hyder Valley I&WDD	3,542	no	Yuma	individual	no	no	no	no	owners	3	none
Maricopa Stansfield IDD	86,600	Pinal	Pinal	individual <sup>1</sup>	no	no	district <sup>4</sup>	yes	weighted	9	conv/exch
Maricopa WD	38,000	Phoenix	Maricopa	individual <sup>1</sup>	district	no	no	yes	weighted	5	none
McMullen Valley WC&DD	33,414	no	La Paz	individual	no	no	no	no	registered voters	3	none
Mohave Valley IDD	21,500	no	Mohave	n/a	no	district	no	no	owners	3	conversion
Mohave WCD (WUA)	4,000	no	Mohave	n/a	no	district	no	no	registered voters	3	none
New Magma IDD	27,000	Phoenix/ Pinal	Maricopa/ Pinal	individual <sup>1</sup>	no	no	district <sup>4</sup>	yes	weighted	7	conversion
Paloma IDD	38,000	no	Maricopa	individual	dist	no	no	no	owners	5	conversion
Queen Creek I(D)D	22,000	Phoenix	Maricopa	individual <sup>1</sup>	no	no	district <sup>4</sup>	yes	owners	3	none
Salt River Valley WUA	248,239	Phoenix	Maricopa	district	individual <sup>3</sup>	no	district <sup>4</sup>	yes	weighted	11	conversion
San Carlos IDD	50,000	Pinal	Pinal	district	district <sup>2</sup>	no	district <sup>4</sup>	no	weighted	9	none
Silver Creek ID	2,500	no	Navajo	district	district	no	no	no	weighted	3	none
Tonopah ID	3,500	Phoenix	Maricopa	individual <sup>1</sup>	no	no	district <sup>4</sup>	yes	weighted	3	conv/exch
Unit "B" IDD	3,406	no	Yuma	none	no	district	no	no	owners	3	none
Wellton-Mohawk IDD	62,744	no	Yuma	no	no	district	no	no	owners	9	conversion
Woodruff ID	550	no	Navajo	individual	individual	no	no	no	weighted	3	none
Yuma County WUA	53,450	no	Yuma	no	no	individual	no	no	weighted	7	conversion
Yuma ID	10,600	no	Yuma	no	no	district	no	no	owners	3	none
Yuma Mesa IDD	20,132	no	Yuma	no	no	district	no	no	other	3	none

<sup>1</sup> Irrigation Grandfathered Rights (IGFR)

<sup>2</sup> Adjudicated rights administered by the Gila Commission

<sup>3</sup> Rights adjudicated - Kent Decree

<sup>4</sup> Central Arizona Project (CAP) 'Ag Pool' contracts

**AMA Factors  
in Exchanges**

Location in an AMA is a factor in exchanges of water. Districts in AMAs participated in water exchanges significantly more than others, reflecting the unique incentives and opportunities provided by groundwater law in AMAs. In fact, all of the exchanges listed were entered into with parties located in an AMA and most involved exchanges of CAP water for groundwater credits in Groundwater Savings Facilities.

**ag pool  
Water**

One substantial group of respondents was districts that have contracted for surplus *ag pool* water with the CAWCD. These districts are in AMAs and within the CAWCD boundaries. Regardless of how they answered the question regarding exchanges, all but one are permitted Groundwater Savings Facilities. In most of these, groundwater rights, in the form of IGFRs, are owned by individuals. Only four districts (of the 10 in AMAs) reported that members had individually transferred rights through the process of converting IGFRs to Type 1 non-irrigation rights or through extinguishment; however, some respondents may have failed to report such conversions because they are uniquely the responsibility of individual land owners. District rules and customary practices give boards different degrees of control over disposition of individually owned water rights.

**Out of District  
Transfers**

Only one irrigation district reported engaging in a transfer defined as a transaction that changed the physical place of use from inside the district's boundaries to outside. This respondent characterized the event as a special, one-time occurrence, never to be repeated. The statement of the respondent captures the sentiment of the majority of those surveyed: the "board will continue to vehemently oppose any proposal to transfer water from [the district]." Of the 16 districts that responded to the question — "is

## AG to Muni Water Use

### Board Opposition

### Legal Constraints

### Indian Settlements

### Section 5 Contract Water

### District Attitude & Recall

### Supply Pressures

your organization generally in favor of or opposed to *transfers* of water?” — nine districts reported that they were opposed to transfers; five were neutral; and two supported “voluntary transfers.” Typically, where boards oppose transfers, they have the power to prevent them. It should be noted that some districts opposed to *transfers* participated willingly in conversions and exchanges.

The positive or neutral attitude of an irrigation district may not significantly increase the likelihood that they will engage in water transfers, however. The rarity of transfers reflects a legal and institutional system that reduces the incentives and increases the barriers to transfers of water across jurisdictional boundaries. One of the neutral districts cited the legal constraints as naturally inhibiting water transfers. Another district reinforced this idea, stating no plans exist to transfer water because of legal obstacles to doing so.

It is unsurprising that transactions in surface water rights are rare, given the situation described above. Survey respondents did not include any of the parties involved in the few surface water transactions reported in the *Water Strategist*. Surveyed districts with surface water rights were no more likely to oppose transfers than other districts.

The single transfer referenced in the survey was one of two instances, in the context of obtaining water for Indian water rights settlements, when Colorado River water rights were transferred from Yuma area irrigation districts to Central Arizona tribes: one from the Wellton Mohawk Irrigation & Drainage District for the Salt River Pima Maricopa Settlement Act, the other from Yuma Mesa Irrigation District for the Ak-Chin settlement.

Aside from the IGFR to Type 1 conversions and Groundwater Savings Facility exchanges, Section 5 contract water (Colorado River) is the only water respondents reported had been transferred. The transfers were characterized as conversions to accommodate growth in Colorado River dependent communities in Yuma County. It is interesting to note that ownership of the rights, whether individual or district, does not appear to be a factor in whether conversions take place, although it has an impact on the distribution of benefits.

In its response to the question concerning the attitude of the district to transfers, the Mohave Valley Irrigation and Drainage District (MVIDD) referred to the recall of the District’s board members. MVIDD lands run beside the Colorado River between the Bullhead City line and the Needles (California) Bridge (Rte. 95). MVIDD supplies all the water for the towns of Fort Mojave and Mohave Valley. Housing and commercial developments on historic farmland are expanding and only about 20 percent of MVIDD’s lands remain in agricultural production. The MVIDD Board has established rules for the orderly conversion of its Section 5 contract water right to municipal uses, and it was the establishment of these rules that precipitated a political firestorm for the Board. At issue were a few fundamental questions. If land is taken out of farming and converted to houses, can the water rights attached to the land be included in the sale or should they revert to the Section 5 contract holder — i.e. the MVIDD? If the farmer (not MVIDD) owns the water rights with the land, can he sell them to a buyer intending to move them off the land? Can a board of directors dominated by farmers make those decisions? In 2005, the MVIDD Board of Directors was removed following a recall election over those questions, and a lengthy Court battle ensued, culminating in an Arizona Supreme Court ruling confirming the ability of irrigation districts to limit voting in board elections to owners of farm land. A new board was selected, and in 2007, the day before a board election, they passed (two farmers to one non-farmer) a policy change that allows right holders to sell all or part of their water rights. Of the 318 registered landowners who voted in the 2005 recall election, only four were agricultural landowners. Forty farmers were allowed to vote in the November 2007 board election; 25 voted. [Editor’s Note: Ownership issues between landowners and irrigation districts recently came to a head before the Oregon Supreme Court, resulting in a decision that established a trust relationship. See Moon, TWR # 54].

## CONCLUSION

As Arizona’s population grows, pressures on existing water supplies will grow. The search for new municipal supplies will continue to focus attention on the relatively large amount of water controlled by agricultural water supply organizations and their members. For voluntary transactions to occur that produce benefits for Arizona, changes may be needed in law, policy and practice; and these changes should be guided by knowledge about the roles of key institutions. This article has attempted to fill a gap in our knowledge of the roles of agricultural water supply organizations in water transfers.

Transfers are occurring and growing economic pressures will likely increase these in the future. Currently most transfers of water from agriculture are occurring within the boundaries of irrigation districts as agricultural land becomes converted into municipal and industrial uses. Though few in number, there



## AG to Muni Water Use

### Legal & Institutional Deterrents

### Transfer Veto Power

are also transfers that move water outside of irrigation districts, but a substantial increase in these kinds of transfers will depend on changes of attitude and law. Irrigation districts are local organizations with an interest in maximizing value to the local community from local resources. At the present time, this means a reluctance to allow the transfer of water rights out of their control.

It is clear that aspects of Arizona law discourage market transactions in water. With the exception of effluent and quantified rights to groundwater (Type 2 rights and credits) within AMAs, voluntary transactions between willing sellers and buyers are deterred by legal and institutional considerations. Protection of potentially affected third parts is emphasized in rules governing surface water transfers and movement of groundwater from one basin to another. Most transfers of groundwater rights for use outside AMAs are not discouraged by law, but the incentives to buy such rights are typically low or non-existent. Arizona law prevents most transfers from outside for use in AMAs where incentives exist. In AMAs, the ease of joining the CAGR, relative to acquiring water rights individually, creates at least a temporary disincentive to development of a water market. In addition, rights to surface water, other than water rights certified by Reclamation contracts, are subject to such uncertainty that transfers can only be effected through a political process such as an Indian water settlement. The exception appears to be conversions from agricultural to municipal use within the boundaries of an established district, possibly extended beyond, but no farther than the immediate surrounding community or county. Even here, the process is subject to public scrutiny, and as the case of MVIDD demonstrates, can occasion considerable public controversy.

Concerning the role of irrigation districts, individual water rights holders may be deterred by the need for district board approval from entering into private water transactions. Special powers of irrigation district boards to veto transfers of surface water within the same river system render such transfers nearly unthinkable. The power of districts to prevent transfers is not absolute, however, and varies with the rules of particular districts. Individually-owned groundwater rights are the least likely to be controlled by district boards. While irrigation district boards may constrain development of a water market in Arizona, it is also true that districts have participated in transfers, even over the objections of individual members — as part of Indian water settlements and in relinquishing CAP subcontracts in exchange for debt relief and CAP *ag pool* water. In addition, the willingness and ability of irrigation districts to obtain permits and manage large scale Groundwater Savings Facilities promotes exchanges and the creation of tradable groundwater credits.

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