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An Introduction to the
CENTRAL ARIZONA GROUNDWATER REPLENISHMENT DISTRICT

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Introduction and Background

The Central Arizona Groundwater Replenishment District (CAGRD) was created by an act of the Arizona Legislature in 1993 to provide groundwater replenishment services within the Central Arizona Project (CAP) service area (Maricopa, Pinal and Pima Counties). The CAGRD is operated by the Central Arizona Water Conservation District, which also operates the CAP; and the Conservation District and Replenishment District share the same Board.

Within the CAP's three-county service area, provisions of the Arizona Groundwater Management Act link state approval for new residential and commercial construction to responsible water use. In 1980, Arizona enacted the Groundwater Management Act to provide a cohesive legal framework for management and conservation of the State's groundwater resources. The Act provided for creation of Active Management Areas in

areas where groundwater overdraft was of critical concern. Five AMAs have been created since the Act came into effect, and three of them, Phoenix, Pinal, and Tucson, coincide roughly with the CAP's three-county service area. Each AMA has its own water management goal: For Phoenix and Tucson the goal is safe-yield[1] by 2025; for Pinal the goal is to maintain the existing agricultural economy for as long as possible while preserving water for non-irrigation uses.

One of the main tools the Act provides for achieving AMA groundwater management goals is the Assured Water Supply (AWS) program. Arguably the most important feature of the Act, AWS requires that proposed residential developments within AMAs demonstrate that enough water is available to satisfy the needs of the development for at least 100 years (ARS §45-576). The Arizona Department of Water Resources (ADWR) determines compliance with AWS rules. In order to demonstrate AWS compliance, an applicant must show:

1. The water supply is physically, legally, and continuously available for the next 100 years.
2. The water meets water quality standards or is of sufficient quality.
3. The proposed water use is consistent with the management goal of the AMA.
4. The proposed water use is consistent with the management plan of the AMA in force at the time of application.
5. The developer has the financial capability to construct any necessary water storage, treatment, and delivery systems.

In general, to meet requirements number 3 and 4, applicants have to show that the development will draw a substantial proportion of its water from renewable supplies.

Although the AWS program was required by the 1980 GMA, ADWR did not begin its AWS rulemaking process until the early 1990s, about the same time that the CAP canal began bringing Colorado River water to the Tucson area. It had been anticipated that the AWS requirement to show use of renewable water supplies would be met largely through

[1] A groundwater management goal which attempts to achieve and thereafter maintain a long-term balance between the annual amount of groundwater withdrawn in an active management area and the annual amount of natural and artificial recharge in the active management area (ARS §45-561).

subcontracts for CAP water. However, when rulemaking was underway, entities without CAP subcontracts or physical access to subcontracted water raised the need for a mechanism to facilitate compliance with the AWS rules. They argued that without such a mechanism, there would be no growth outside areas without access to the CAP or other renewable water sources. These concerns led to the creation of the CAGRD.

The CAGRD allows development to occur far from the CAP or other renewable source and to supply the needs of water users there with groundwater. When a water provider or development entity becomes a member, the CAGRD assumes the replenishment obligations of the development and promises to replenish the legal equivalent of the renewable water the development would otherwise have had to use. In essence, the water provider or development owner contracts for replenishment services.

CAGRD Finance Mechanism

There are two types of memberships in the CAGRD: Member Service Areas (MSA) and Member Lands (ML), which correspond to the two categories of water users subject to AWS rules. Generally, MSAs are the water service areas of municipal water providers, and may be water companies, water districts, towns and cities; MLs are subdivisions. The costs associated with membership are calculated and/or collected differently for each of the two membership types.

The CAGRD funds itself through the collection of fees, charges, assessments and taxes (ARS §48-3772). Applicants for membership are required by CAGRD policy to pay a one-time, up-front Enrollment Fee. MSA applicants pay a flat Enrollment Fee currently set at $5,000, and ML applicants pay a “per-unit” Enrollment Fee (currently set at $20/unit) based on the total number of housing units in the subdivision. Recent statutes also require members to pay to CAGRD Activation Fees and Replenishment Reserve Fees (ARS §48-3772 sub H). The Activation Fee is a per-unit fee (currently set at $60/unit) that must be paid on behalf of all member subdivisions (both ML and MSA) prior to receiving a Subdivision Public Report from the Arizona Department of Real Estate. The Replenishment Reserve Fees must be paid by new members as of 2004 and

are based on the Replenishment Reserve Charge for their AMA and the volume of their projected build-out replenishment obligation.

In addition to fees associated with application for membership, all CAGRD members pay a certain amount per acre-foot annually according to a rate determined each year by the CAGRD. The rate is computed separately for each AMA to offset the projected costs of replenishment activities in the AMA, and is based on the four assessment rate components shown in Table 1. Table 2 shows the 2005 rates per acre-foot for the three AMAs.

Table 1. CAGRD Replenishment Assessment Components

Assessment Rate Components	**Cost Basis**
Administrative*	Total cost of administering the CAGRD
Water & Replenishment**	Cost to purchase, transport and recharge/replenish water supplies
Infrastructure & Water Rights**	Costs of securing water rights and developing infrastructure to deliver and replenish water, including capital costs
Replenishment Reserve Charge**	Costs to establish and maintain a replenishment reserve for each AMA

*Uniform across AMAs
**Computed separately for each AMA

Each MSA provider reports annually the volume of excess groundwater[2] it has delivered within its service area and pays, directly to the CAGRD, a tax equal to the AMA replenishment assessment rate multiplied by that volume of excess groundwater. When an individual subdivision joins as a ML, the owner executes an irrevocable "declaration of covenants, conditions, and restrictions" that obligates current and future owners (that is, individual homeowners) to pay for CAGRD replenishment based on the total volume

[2]An amount of groundwater equal to that delivered to a member land or member service area in a calendar year in excess of the amount of groundwater that may be used at the member land or delivered by a municipal provider for use within its member service area in that calendar year consistent with the applicable AWS rules for the active management area where the member land or member service area is located (ARS §48-377.01).

of excess groundwater delivered to each parcel within the ML. The applicable parcel assessment appears on the property tax bill of each property owner within the ML.

Table 2. 2005 CAGRD Replenishment Assessment Rates

Rate Component	Phoenix AMA	Pinal AMA	Tucson AMA
Water & Replenishment	$101	$81	$115
Administrative	$40	$40	$40
Infrastructure & Water Rights	$40	$40	$40
Replenishment Reserve Charge	$31	$31	$31
Total Assessment Rate ($/AF)	$212	$192	$226

CAGRD Planning

The CAGRD must submit a Plan of Operation to the Director of ADWR every ten years. The Plan should describe CAGRD activities planned for the 100 years following its submission. By statute, the Plan must include the following (ARS §45-576.02):

- CAGRD's past replenishment obligation and the extent to which those obligations have been met
- Estimates of current and projected groundwater replenishment obligation extending 20 years and 100 years into the future
- Descriptions of the water resources the CAGRD plans to use for replenishment purposes in the next 20 years and potentially available for replenishment in the subsequent 80 years
- A description of the CAGRD's replenishment reserve activities
- Descriptions of any facilities the CAGRD plans to use for replenishment in the next 20 years
- An analysis of potential recharge facilities that *may* be used by CAGRD for replenishment
- A description of the CAGRD's capability to meet current and projected replenishment obligations for the next 20 years
- Any other information the ADWR Director may require.

In October 2005, the ADWR Director accepted the CAGRD's 2004 Plan of Operation, deeming it consistent with the management goals of the three AMAs it serves. That plan states that the CAGRD's cumulative replenishment obligation through the end of 2003 was almost 56,300 acre-feet, of which just over 39,400 acre-feet had been satisfied. Most of the unsatisfied replenishment obligation of approximately 17,000 acre-feet resulted from CAGRD members' use of excess groundwater in 2003. According to current law, replenishment to offset these unsatisfied obligations must be accomplished within three years of incurring them (ARS §48-3771).

CAGRD enrollment as of December 31, 2003 is displayed in Table 3; the table shows the growth in membership from 1995 through 2003. Table 4 shows the amount of excess groundwater reported by members and the amount of groundwater the CAGRD replenished in those same years.

The 2004 Plan also shows that the CAGRD replenishment obligation is expected to grow phenomenally in the next 20 years and beyond. As homes within existing MLs and MSAs are built and occupied, their water demand will increase; consequently the CAGRD's replenishment obligation is likely to increase. In addition CAGRD membership is expected to grow significantly.

Table 3. Historic Growth in CAGRD Enrollment

Year	No. of MLs	No. of ML Homes	No. of MSAs
1995	4	184	3
1996	41	5,633	2
1997	65	8,936	3
1998	57	7,635	2
1999	73	11,358	3
2000	83	36,715	2
2001	62	15,757	2
2002	49	13,696	2
2003	118	25,032	0
Total	552	124,946	19

Table 4. Reported Excess Groundwater Use and CAGRD Replenishment (Units: Acre-feet)

Year	Excess GW	GW Replenished
1995	0.1	0.0
1996	45.0	0.0
1997	338.0	0.0
1998	943.0	0.1
1999	2197.0	53.4
2000	4257.0	428.1
2001	13095.0	10791.1
2002	15912.0	9665.3
2003	19490.0	18465.9
Total	56,277.1	39403.9

The CAGRD plan contains projections of growth in replenishment obligation for currently enrolled members and expected new membership. In the CAGRD's first (1994) Plan of Operation the 20-year projections showed that the total yearly replenishment obligation was not expected to exceed 50,000 acre-feet. The 2004 Plan of Operation revises these projections upward in accord with new understanding of growing demand for CAGRD's services. Figure 1 displays these projections out to 2035 in graph form. The lower line indicates the growth of obligations from currently enrolled members and the upper line indicates the additional growth of obligations expected from new members. If these projections are realized, the CAGRD will be obligated to replenish more than 200,000 acre-feet of water per year by 2025. This possibility has raised concern among public officials, water providers and developers in the CAGRD service area and beyond.

Until now, the CAGRD has relied exclusively on excess Central Arizona Project water to meet its obligations. According to the recently approved plan, however, there will not be enough CAP water available to the CAGRD in the future to meet projected obligations. Other potential sources described in the plan include non-CAP Colorado River water (for example, leasing of Indian water), effluent, and imported groundwater.

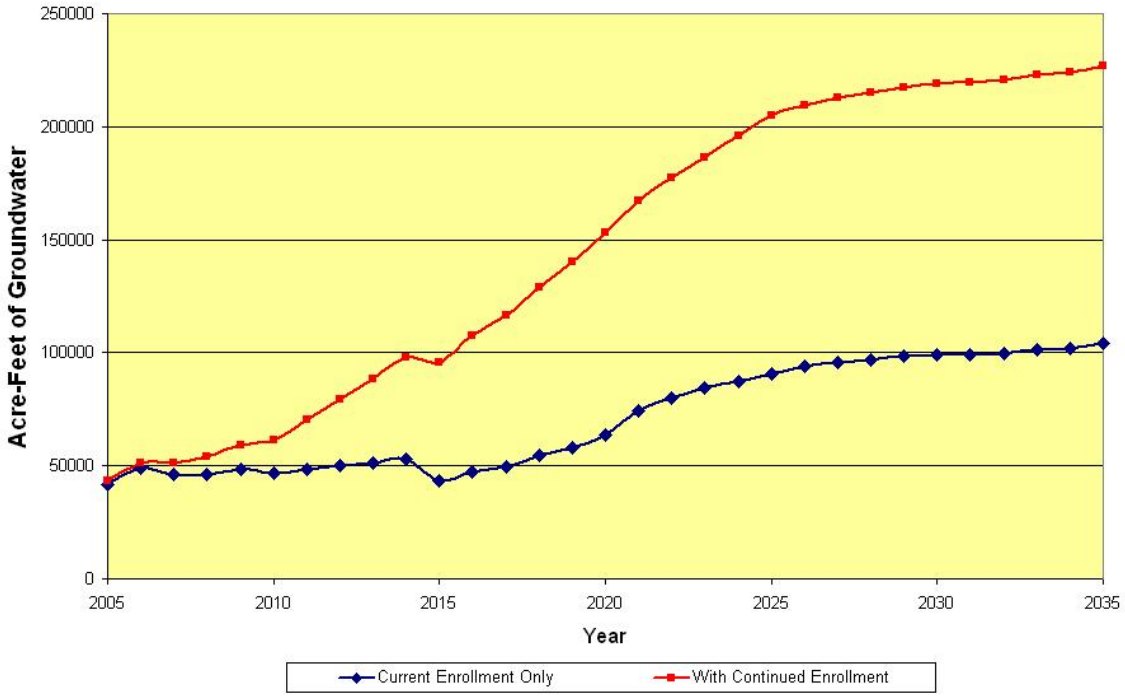

Figure 1. CAGRD Replenishment Obligations

Analysis

Although the Plan includes a list of alternative water sources to meet future replenishment obligations, these supplies are not under contract to the CAGRD. Moreover, the same sources identified by the CAGRD are being looked to by other entities, including large municipal water providers in the Tucson and Phoenix AMAs, to meet their own future water needs. The tremendous growth in projected replenishment obligation shown in Figure 1 incorporates projected membership growth through 2015. The next 10-year plan will forecast growth through 2025. The concept of limiting membership in the CAGRD has been raised, but doing so has significant implications for the growth of the Phoenix, Pinal and Tucson AMAs. If the CAGRD remains open to all applicants that meet membership requirements, future replenishment obligations will continue to grow. At what rate is subject to speculation.

The uncertainty surrounding the manner in which future replenishment obligations are met translates into significant uncertainty regarding the cost of replenishment. Some question the ultimate ability of the CAGRD to meet its obligations. Others are confident that the CAGRD can be creative in how it structures contracts for water. The fact that it does not have to demonstrate access to water for a full 100 years can work to its advantage as it assembles a portfolio of water sources with different terms. However, this very fact gives rise to the question: Are we allowing too much growth not based on a showing of 100 years worth of firm supply to occur in the AMAs?

Another long-term issue that remains unresolved is the location of replenishment relative to groundwater pumping. The requirement that replenishment occur within the same AMA but not in the location of groundwater pumping by members can lead to localized declines in groundwater tables. Although members of the CAGRD must show there is water physically available and groundwater use is in fact balanced with replenishment on an AMA-wide, and in some cases a sub-AMA basis, some would like to see a closer physical hydrologic relationship between replenishment and groundwater pumping. However, locating replenishment closer to pumping would in many cases have significant costs associated with it – costs that would be difficult to justify given that current statutory groundwater management goals are established on an AMA-wide basis.

Conclusions

The Central Arizona Groundwater Replenishment District is considered an essential mechanism to facilitate compliance with the Assured Water Supply rules. The AWS rules and the CAGRD were meant to preserve essential groundwater resources under conditions of rapid, sustained population growth. Preservation of groundwater supplies into the future continues to be an important policy goal for Arizona. The central questions for the future include: Where will water to meet replenishment obligations come from? What effect will the CAGRD's activities to obtain additional water supplies have on the plans of other entities? How much will it all cost? It is important that the public understand the role of the CAGRD and the challenges it faces as Arizona continues to grow in the coming decades.