

GOOD INTENTIONS, UNINTENDED CONSEQUENCES: THE CENTRAL ARIZONA GROUNDWATER REPLENISHMENT DISTRICT[†]

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INTRODUCTION

A semi-arid state with a rapidly expanding population, Arizona faces a never-ending struggle over water supply problems. Three primary sources of water—state surface water, Colorado River surface water, and groundwater—are available to Arizona's population. Central Arizona relies on surface water from the Salt, Verde, and Gila Rivers, while northern Arizona diverts water from the Little Colorado River watershed. Arizona law governs rights to surface water by the prior appropriation doctrine, a first-in-time is first-in-right concept that rewards the earliest diverters with the senior rights.¹ In the 1970s, uncertainty over surface water rights led the Salt River Project to initiate the Gila River General Adjudication in an effort to obtain a court decree that determines all surface water

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1. See DAVID H. GETCHES, WATER LAW 74 (3d ed. 1997).

rights to the Gila River and its tributaries.² Thirty-five years later, the Adjudication Court recently received a proposed settlement of the rights of the major players in the Gila River Adjudication.³ Uncertainty remains: the Adjudication has settled few rights even as it has consumed tens of millions of dollars in attorneys' and consultants' fees. One thing is certain: The prior appropriation claims filed with the Adjudication Court vastly exceed the amount of surface water available.

Central and southern Arizona depend on Colorado River water delivered through the Central Arizona Project ("CAP"), a 335-mile canal that moves water uphill from the western edge of the state east to Phoenix and then south to Tucson.⁴ Rights to use CAP water depend on a complex set of arrangements that include a contract between the U.S. Secretary of the Interior and the State of Arizona, a master contract between the U. S. Bureau of Reclamation and the Central Arizona Water Conservation District ("CAWCD"), and sub-contracts between CAWCD and various entities. Not too long ago, there was a surplus of CAP water available,⁵ but today there is competition among Arizona's municipal water providers to obtain rights to use CAP water.⁶

The other significant source of water for Central Arizona is groundwater, which Arizona's farmers, mines, cities, and homeowners are pumping much faster than Mother Nature replenishes it.⁷ Until the enactment of the Arizona Groundwater Management Act in 1980, landowners in Arizona were free to pump a limitless amount of water so long as the water was put to "beneficial use" on the overlying land.⁸ This doctrine sanctioned unsustainable groundwater pumping, which, in a classic example of the tragedy of the commons, led to significant declines in groundwater levels, resulting in the desiccation of formerly perennial streams, impairment of perfected surface water rights, a reduction in riparian

2. See Overview of Arizona's General Stream Adjudications, <http://www.supreme.state.az.us/wm/bulletin/Overview.htm> (last visited Dec. 20, 2006) (follow "How did these adjudications start?" hyperlink).

3. See Supreme Court of Ariz., Gila River Pending Cases and Decisions, <http://www.supreme.state.az.us/wm/Gila.htm> (follow links under "*In re* Proposed Gila River Indian Community Water Rights Settlement, Contested Case No. W1-207" and "*In re* Proposed Tohono O'Odham Nation Water Rights Settlement, Contested Case No. W1-208").

4. See Robert Jerome Glennon, *Coattails of the Past: Using and Financing the Central Arizona Project*, 27 ARIZ. ST. L.J. 677, 682 (1995).

5. *Id.* at 683, 704-05, 715-18.

6. See ARIZ. DEP'T OF WATER RES., REVISED POLICY REGARDING TRANSFERS OF CENTRAL ARIZONA PROJECT MUNICIPAL AND INDUSTRIAL WATER SUBCONTRACT ENTITLEMENTS (2006); see also ARIZ. DEP'T OF WATER RES., RESPONSE TO PUBLIC COMMENTS REGARDING THE REVISED CENTRAL ARIZONA PROJECT MUNICIPAL AND INDUSTRIAL ENTITLEMENT TRANSFER POLICY (2006); ARIZ. DEP'T OF WATER RES., POLICY AND PROCEDURES FOR TRANSFERRING AN ENTITLEMENT OF LOWER BASIN COLORADO RIVER WATER WITHIN THE STATE OF ARIZONA (2004).

7. See Robert Jerome Glennon, "*Because That's Where the Water Is*": Retiring Current Water Uses to Achieve the Safe-Yield Objective of the Arizona Groundwater Management Act, 33 ARIZ. L. REV. 89, 92 (1991).

8. See *Bristor v. Cheatham*, 255 P.2d 173 (Ariz. 1953) (holding that groundwater use in Arizona is subject only to the doctrine of reasonable use).

habitat, subsidence, differential cracking, localized watershed reversals, diminished water quality, and reduced well productivity.⁹

In the late 1940s, the Arizona Legislature authorized the State Land Commission to designate “critical groundwater areas.”¹⁰ In 1973, the legislature began to require developers of land to prove that they had an “adequate” water supply.¹¹ However, failure to demonstrate such an adequate supply did not prevent the developer from subdividing the lands; it only required notification to initial purchasers that there might not be an adequate supply of water. Subsequent purchasers likely received no such notice.

I. THE 1980 ARIZONA GROUNDWATER MANAGEMENT ACT

In the late 1970s, a number of forces coalesced to produce the perfect scenario for overhauling Arizona’s antiquated groundwater law. The chronic overdrafting of the state’s groundwater reserves posed a long-term threat to the state’s economic wellbeing. Secretary of the Interior Cecil Andrus threatened the state with loss of funding for construction of the CAP unless the state reformed its groundwater law.¹² And the Arizona Supreme Court issued a ruling that threatened to prohibit any transportation of water off the overlying land, something that both the copper mines and major cities, such as Tucson, had come to depend upon.¹³

The 1980 Groundwater Management Act (“GMA”)¹⁴ was truly progressive. The GMA established a system of quantified rights for all existing groundwater users within certain areas of the state called Active Management Areas (“AMAs”), made most rights transferable, restricted initiating most new groundwater uses within AMAs, established strong management by a new state agency, the Department of Water Resources (“DWR”), and required water conservation programs.¹⁵ The great compromise that enabled passage of the GMA came through “grandfathering in” existing uses of groundwater. The GMA had limited effect on mines and existing farms and resorts, which were the backbone of Arizona’s historic “Five C’s” economy of “Copper, Cotton, Citrus, Cattle and Climate,” but it restricted the use of relatively inexpensive groundwater for new

9. See Robert Jerome Glennon and Thomas Maddock, III, *In Search of Subflow: Arizona’s Futile Efforts to Separate Groundwater from Surface Water*, 36 ARIZ. L. REV. 567 (1994). Arizona is not alone in the failure of its law to integrate ground and surface water. See ROBERT GLENNON, *WATER FOLLIES: GROUNDWATER PUMPING AND THE FATE OF AMERICA’S FRESH WATERS* (2002).

10. See Michael J. Pearce, *Water Law*, in 1 ARIZONA ENVIRONMENTAL LAW MANUAL § 3.2 (Nicholas J. Wallwork ed. 1999).

11. Act effective May 1, 1973, 1973 Ariz. Sess. Laws ch. 94, § 3 (codified as amended at ARIZ. REV. STAT. ANN. § 45-108(c) (2006)).

12. Arizona Governor Bruce Babbitt welcomed—and even encouraged—Andrus’ threat as a means of forcing water interests to compromise on a groundwater management plan. See BRUCE BABBITT, *CITIES IN THE WILDERNESS: A NEW VISION OF LAND USE IN AMERICA*, 131–32 (2005).

13. See Glennon, *supra* note 7, at 105–13. For the Arizona Supreme Court decision that created this crisis, see *Farmers Inv. Co v. Bettwy*, 558 P.2d 14 (Ariz. 1976).

14. 1980 Ariz. Sess. Laws 4th Spec. Sess., ch. 1, § 86 (codified at ARIZ. REV. STAT. ANN. §§ 45-401 to -704 (2006)).

15. Glennon, *supra* note 7, at 90–91.

residential developments and some new industry, particularly in three of the four original AMAs that bore the regulatory brunt of the new statute.¹⁶

II. ASSURED WATER SUPPLY RULES

A cornerstone of the GMA is its Assured Water Supply (“AWS”) program.¹⁷ The AWS program imposed water supply requirements on developers of raw land in unincorporated areas in the AMAs that were more rigorous than regulations anywhere else in the United States. The AWS program had a significant effect on the water supply demonstration requirements of cities and towns with their own municipal water utilities, particularly those cities that were growing rapidly. As envisioned, the program is quite straightforward: A developer cannot obtain subdivision plat approval without demonstrating that (1) a 100-year supply of water sufficient to satisfy the needs of the subdivision is physically, legally, and continuously available; (2) the water use is consistent with the management plan and goal for the AMA where the development will be built; and (3) the developer has the financial capability to construct the necessary water infrastructure to use the available supply.¹⁸ For developments located within a municipal water provider’s service area, which is usually but not always the city or town limits, these regulatory showings are usually met by the municipal water provider. For development located outside the urban/suburban core, however, the AWS requirements are primarily the developer’s responsibility.

Implementing the statutory requirements through administrative rules proved challenging. When DWR published the initial AWS rules in 1988, they generated a storm of controversy which led DWR to withdraw them. The developers’ concerns focused on provisions that would have effectively down-zoned property located outside of municipal water providers’ service areas because local supplies of “renewable” water were not available to support the densities allowed by current zoning.¹⁹

In the early 1990s, DWR commenced an extensive public participation process that culminated in 1995 with an adapted set of assured and adequate water supply rules.²⁰ As the rules evolved, developers, now fully aware of the AWS

16. The Pinal AMA is managed under a different regulatory goal, but development there also must demonstrate an assured water supply. ARIZ. REV. STAT. ANN. § 45-562(B) (2006).

17. See ARIZ. REV. STAT. ANN. §§ 45-576, -576.03. For background on the assured water supply program, see generally Glennon, *supra* note 4.

18. ARIZ. REV. STAT. ANN. § 45-576 (2006); Glennon, *supra* note 7, at 105–13.

19. See Glennon, *supra* note 7, at 106.

20. See ARIZ. ADMIN. CODE § R12-15-701 to -725 (2006). The Assured and Adequate Water Supply Rules package includes a portion dealing with AWS, which governs subdivision development in AMAs. The adequate water supply portion governs development in the rest of Arizona. Administrative rules, of course, must track the underlying statute. In the case of the assured supply rules, the underlying code provision is Arizona Revised Statutes section 45-576. The problem is that section 45-576 gives little guidance to DWR as to how to determine whether the water supply of a proposed subdivision meets the various criteria promulgated by statute. The 1995 AWS rules are complicated and beyond the scope of this Article. DWR proposed an overhaul to the rules in

program's requirement for utilization of renewable supplies, sought to find a mechanism to facilitate meeting this requirement. Many developers outside of the boundaries of municipal water providers had no legal or physical access to CAP water supplies. In order to develop their properties, they sought to find another method of securing an AWS.²¹

A deal was struck. In exchange for a workable mechanism for utilizing renewable water supplies, the development community would not oppose the proposed AWS rules. In 1993, after considerable discussion and debate as well as other unsuccessful attempts at establishing a replenishment agency, the legislature authorized CAWCD—the agency responsible for operating the CAP canal—to perform replenishment for groundwater use that exceeded the amount of pumping allowed by the proposed rules.²²

The experience of implementing the GMA's requirement for an AWS program underscored the challenges associated with putting into practice a sensible long-term policy for the State of Arizona. If there is one universal truth about developers, it is that they can handle any answer from regulators except: "You may not build." Sophisticated developers understand that regulatory costs associated with new subdivisions are simply a cost of doing business. Developers want cost-effective, workable mechanisms to comply with regulatory requirements. To prohibit development entirely would have been unacceptable, not only for developers, but also for the economic engine that home building and growth have become for Arizona.

In short, DWR's unsuccessful 1988 AWS rule-making process led the development community and DWR to join together to propose to the Arizona Legislature a novel mechanism for AWS program compliance. The proposal, optional membership in a new subsidiary organization of CAWCD called the Central Arizona Groundwater Replenishment District ("CAGR"), has turned out to be more attractive than most participants originally imagined.

III. THE CENTRAL ARIZONA GROUNDWATER REPLENISHMENT DISTRICT

The CAGR legislation enabled those without CAP subcontracts or direct access to renewable water supplies to meet a key requirement of the AWS rules—demonstrating consistency with the management goal of the AMAs in Central Arizona.²³ The AWS rules require renewable water supplies to be used to

2006. The proposed changes will streamline the process and significantly increase the cost of obtaining a certificate of AWS.

21. By the late 1980s, even if developers had been inclined to find their own renewable supplies, it was not apparent that they would have been able to procure them. Arizona's surface water had long been over-allocated, and the Secretary of the Interior had allocated most of the Central Arizona Project water to farmers and municipal water providers.

22. ARIZ. REV. STAT. ANN. §§ 48-3771 to -3784 (2006).

23. For a primer on CAGR, see Justin Ferris, Sharon Megdal & Susanna Eden, *An Introduction to the Central Arizona Groundwater Replenishment District* (2006), <http://www.cals.arizona.edu/azwater/>.

meet a large proportion of the water requirements of new development. However, development may proceed on the basis of groundwater use, provided there is a demonstration to DWR that 100 years of groundwater is legally and physically available to serve the development. The use of renewable supplies may be “indirect” through the state’s storage and recovery program.²⁴ CAGRDR was created to enroll members for whom it is obligated to replenish groundwater use that is determined to be “excess groundwater” according to the detailed calculations of the AWS rules.²⁵ In effect, state law allows CAGRDR members to meet the AWS program requirement of consistency with the management goal without directly utilizing renewable resources.²⁶

There are two common types of CAGRDR membership.²⁷ Enrollment as Member Service Areas (“MSAs”) is offered to municipal water providers²⁸ seeking a “Designation” of AWS for their entire service areas. Enrollment as Member Lands (“MLs”) is available to individual subdivisions for which a “Certificate” of AWS is requested.²⁹

A. Member Service Areas

MSAs are created when a municipal water provider joins CAGRDR by entering into a MSA agreement.³⁰ Once enrolled, the member is obligated to make annual reports of the volume of excess groundwater delivered within its service area.³¹ CAGRDR uses the amount of excess groundwater to compute the

24. See Sharon B. Megdal, *Arizona’s Recharge and Recovery Programs*, in *ARIZONA WATER POLICY: MANAGEMENT INNOVATIONS IN AN URBANIZING, ARID REGION* 188 (Bonnie G. Colby & Katharine L. Jacobs eds., 2007).

25. See ARIZ. REV. STAT. ANN. § 48-3771 to -3783 (2006). The determination of excess groundwater in any year depends on the groundwater allocations at the time of designation or certification, which vary by AMA, incidental recharge, and decisions made by water providers that are members or are serving MLs. Although the CAWCD has the responsibility for administering the Groundwater Replenishment District, nothing in the legislation names the replenishment district as the “Central Arizona Groundwater Replenishment District,” nor is it formed as a separate entity to the CAWCD. Since its formation, however, CAGRDR has stuck as a term of art, perhaps because the Central Arizona Water Conservation and Groundwater Replenishment District (CAWCDGRD) is too cumbersome even for the acronym-based variant of the English language spoken by the Arizona water community. Alternatively, it may have been called that to distinguish it from the authorized-but-not-formed Phoenix Replenishment District or the temporarily-formed-and-now-defunct Santa Cruz Valley Water District.

26. This option is also available to water providers who on their own utilize their renewable supplies indirectly through recharge and recovery.

27. Which correspond to the two ways in which DWR determines compliance with the terms of the AWS Rules. The City of Scottsdale is the sole “Water Availability Status” (“WAS”) member service area. WAS membership, and its implications for solving some of the unanticipated consequences of CAGRDR, is discussed below at Part V.D.

28. ARIZ. REV. STAT. ANN. § 48-3780.

29. *Id.* § 48-3774.

30. A municipal provider for MSA purposes is a “city, town or private water company or an irrigation district that supplies water for non-irrigation use.” ARIZ. REV. STAT. ANN. §§ 48-3701(13), 48-3780(A).

31. Reports must also be made for any extensions thereto. *Id.* § 48-3780(A)(8).

replenishment tax for the previous year, which is paid by the municipal provider.³² Upon applying to enroll in CAGR, the applicant provides an estimate of the member's future water use based on population projections for the MSA, which serves as a foundation for CAGR's future planning efforts, but this estimate does not limit the MSA's future growth or its future replenishment obligation.³³ In addition, CAGR typically requires MSAs to report a certain minimum volume of excess groundwater, so it can be fairly said that until 2001, the replenishment obligations for most MSAs have a floor, but no ceiling.³⁴ MSA agreements for those that have enrolled since 2001 have included a maximum volume that may be reported as excess groundwater in any given year, thus providing a ceiling as well as a floor. MSA enrollment in CAGR, along with satisfaction of the other criteria defined in the AWS Rules, enables the MSA to obtain a designation of AWS for its entire service area.³⁵ Almost without exception, municipalities that had political influence along with CAP water allocations and the means to deliver that water when the GMA was enacted have not enrolled in CAGR. The cities of Phoenix, Mesa, and Tempe are notably absent; Scottsdale has a limited enrollment as a Water Availability Status ("WAS") member with a maximum replenishment obligation of 3,460 acre-feet.³⁶ Most of the municipalities in the groundwater and CAP-dependent Tucson AMA have enrolled: Tucson for reasons unique to Tucson,³⁷ and others because they did not operate utilities when CAP allocations were initially made. MSA enrollment has allowed later-developing municipalities like Marana, Oro Valley, Surprise, Goodyear, Avondale, and El Mirage to meet the "Consistency with Management Goal" criterion of AWS requirements within their respective jurisdictions.

B. Member Lands

MLs are established when a developer of a subdivision executes a Declaration of CC&R and the owner and water provider execute a reporting agreement with CAWCD.³⁸ Upon recordation of these two documents, the land

32. *Id.*

33. CENT. ARIZ. GROUNDWATER REPLENISHMENT DIST., PLAN OF OPERATION 7-8 (2004) [hereinafter 2004 PLAN OF OPERATION], available at http://www.cagr.com/pdfs/submitted_plan.pdf (last visited Jan. 8, 2007).

34. *Id.* at 7.

35. Whether this is true depends on the terms of the MSA agreement which may vary between water providers. For example, the City of Tucson's MSA agreement limits CAGR's replenishment responsibilities to 12,500 acre-feet per year, but most other MSA agreements do not.

36. 2004 PLAN OF OPERATION, *supra* note 33, at 9-10. WAS membership is a novel method of membership approved by the Arizona legislature in 1999. See Act of May 12, 1999, 1999 Ariz. Sess. Laws ch. 206, § 2 (amending ARIZ. REV. STAT. ANN. §§ 48-3772(B)(9) to -3772(B)(11)).

37. CAGR membership allowed Tucson to maintain its AWS designation during a bridge period between 1995 and 2000, when difficulties with delivering CAP water led Tucson voters to reject the city's plan for direct delivery of the CAP water. Tucson now recharges much of its CAP allocation in Tucson-area recharge projects and delivers the "blend" of CAP water and groundwater to its customers.

38. ARIZ. REV. STAT. ANN. §§ 48-3774(A), (C).

qualifies as an ML, and CAGR D is obligated to provide replenishment services based on excess water use in the boundaries of the development, as determined by the provisions of the development's Certificate of AWS.³⁹ The most common method to show DWR that renewable water supplies will be utilized for the proposed development is to enroll the subdivision in CAGR D as an ML.⁴⁰ Per the AWS rules, the developer must prove physical and legal availability of groundwater to meet 100-year demand and financial capability to deliver the water. As part of the AWS and enrollment processes, the developer pays a modest fee to enroll lands in CAGR D. If ADWR is satisfied that the other criteria are met, the developer receives a Certificate of AWS. The replenishment obligation, including acquisition of renewable water supplies, rests with CAGR D. Excess groundwater use is tracked to individual lot owners and CAGR D bills homeowners for the replenishment services through property tax assessments.⁴¹ But because CAGR D's replenishment rates will vary over time, these assessments necessarily vary due to the indeterminate future price for water.⁴²

The two separate legal documents that enroll MLs place the responsibility for AWS compliance upon the subsequent homeowner, not the developer. The first, the Member Land Declaration, is an irrevocable set of covenants, conditions, and restrictions that run with the land, enroll the land in CAGR D, and obligate current and all future property owners to pay the replenishment assessment.⁴³ The second document is the Member Land Agreement between CAGR D, the landowner and the local water provider (often a groundwater-based private utility formed to serve the planned community), which

39. *Id.*

40. Enrollment in CAGR D is frequently the most cost efficient means by which the developer can prove consistency with the management goal, and consistency with the management goal is often the most difficult component of AWS compliance. *See* ARIZ. REV. STAT. ANN. § 45-576.01(B) (2006).

41. ARIZ. REV. STAT. ANN. §§ 48-3778 to -3779.

42. Replenishment fees are in addition to the normal charges a residential customer pays for water services. This variability over time is also true for customers of MSAs. However, replenishment charges are assessed through water bills rather than assessments that appear on property tax bills. It should be noted that replenishment charges by CAGR D generally are the same for MSA and MLs in an AMA and reflect the average cost of replenishment for all members. Discussion of the exceptions is beyond the scope of this Article.

43. Because the replenishment assessment does not apply until the replenishment obligation commences, these assessments are, with the exception of a few months of "model home" use, paid by subsequent homeowners, not by the developers themselves. By contrast, many Arizona municipalities have adopted resource fees, such as the City of Peoria's \$616 fee for off-Salt River Project construction, that attempt to capture the cost of providing a water supply to the residence. City of Peoria, Development and Impact Fees, http://www.peoriaaz.com/building/Forms/Building_PDF/100_Impact_Res_06.pdf (last visited Sept. 4, 2006). CAGR D's enrollment fees are quite modest by comparison, and are currently set at \$23.00 per housing unit. CAGR D also charges an activation fee of \$62.00 per housing unit, which must be paid prior to the issuance of a public report by the Arizona Department of Real Estate. The current CAGR D fees are available at the Central Arizona Project website, <http://www.cap-az.com/management/index.cfm?action=rates&subSection=11> (last visited Mar. 28, 2007).

obligates the water provider to report water delivery information to CAGRD.⁴⁴ CAGRD calculates the replenishment assessment based on rates set by its Board. Replenishment assessments are paid as property tax assessments; unlike water utility bills, they are commonly tax-deductible, so the out-of-pocket cost to the subsequent homeowners is slightly less than assessments captured in an MSA provider's water bill. For CAGRD, it is easier to project the long-term replenishment obligation for MLs because the boundaries of the subdivision and the number of units to be built are established in initial AWS filings.⁴⁵

C. CAGRD Replenishment

CAGRD must replenish in an AMA an amount of water equal to the excess groundwater pumped or received by its members in that AMA.⁴⁶ CAGRD has three years to meet this replenishment obligation; credits for future excess groundwater use require additional replenishment.⁴⁷ The water used for replenishment to date has been CAP water, but CAGRD is authorized to use other sources, such as effluent. CAWCD may use water from any lawfully available source for replenishment, except groundwater withdrawn from within an AMA.⁴⁸ The replenishment obligation is most often met through recharge of water by CAGRD at an underground storage facility.

State law requires CAGRD to obtain DWR approval of a "Plan of Operation" every 10 years.⁴⁹ CAGRD need not show physical, continuous, and legal rights to the replenishment water. The Plan of Operation describes CAGRD activities planned for the 100 years following its submission. The most important components of the Plan of Operation are the following: an analysis of CAGRD's past replenishment obligation and the extent to which the obligation has been met; an estimate of the current and projected groundwater replenishment obligation extending 20 years and 100 years into the future; a description of the water resources to be used for replenishment purposes in the next 20 years and of the resources potentially available for replenishment in the subsequent 80 years; a description of the replenishment reserve activities accomplished in the previous ten years and plans for the next ten years; and a description of actual and potential facilities to be used for replenishment in the next 20 years.⁵⁰

Between 1995 and 2003, 19 MSAs and 552 MLs enrolled in CAGRD.⁵¹ In its original 1994 Plan of Operation, CAGRD estimated that its 2014 replenishment obligation would be slightly more than 37,000 acre-feet.⁵² CAGRD

44. 2004 PLAN OF OPERATION, *supra* note 33, at 8.

45. *Id.*

46. ARIZ. REV. STAT. ANN. § 48-3771(B) (2006).

47. *Id.* § 48-3771(A).

48. *Id.* § 48-3771(C).

49. *Id.* § 45-576.02.

50. *Id.*

51. 2004 PLAN OF OPERATION, *supra* note 33, at 14.

52. CENT. ARIZ. GROUNDWATER REPLENISHMENT DIST., PLAN OF OPERATION (1994). A summary of the 1994 Plan of Operation is available at <http://www.cagrd.com/Downloads/index.cfm?action=Plan> (last visited Mar. 30, 2007).

now estimates that obligation will be 97,700 acre-feet.⁵³ CAGRD's projected replenishment obligation for 2035, 20 years beyond the end point of the currently approved CAGRD Plan of Operation, is over 225,000 acre-feet.⁵⁴

Despite all the listed requirements for the Plan of Operation, a showing of firm renewable water supplies is not required; rather, it must simply describe "the water resources that are expected to be available for replenishment purposes."⁵⁵ In this fashion, CAGRD, at least as originally envisioned, is able to use short-term or "bridge" supplies of water to meet its obligations in ways not otherwise available under a traditional AWS designation.⁵⁶ CAGRD also presented a method of putting excess CAP water to use at a time when there was limited agricultural and municipal demand for CAP water and some CAP subcontractors were having difficulties meeting their financial obligations under their subcontracts.⁵⁷ But this reliance on short-term supplies exposes the limitations of a groundwater-based AWS supported by a replenishment requirement to be satisfied by CAGRD.

IV. UNINTENDED CONSEQUENCES

CAGRD is neither a "bailout" from the rigors of compliance with the AWS program nor a "panacea" for growth-related water supply issues. The legislature created CAGRD's replenishment function as a reasonable mechanism for ensuring compliance with the AWS rules by those who did not have access to renewable supplies. CAWCD, a multi-county political subdivision with the power to tax and the expertise necessary to buy, sell, lease, or otherwise obtain renewable supplies of water in a coordinated fashion, is suited for this task.⁵⁸ In theory, CAWCD and its subsidiary CAGRD can use specialized experience and resources to obtain renewable water supplies.

To understand the significance of the replenishment mechanism for AWS compliance, consider the differences between this "pay later" mechanism and the "pay now" AWS mechanism originally envisioned under the GMA. Both mechanisms require a showing that a "sufficient quantity of water is continuously available to satisfy the water demands of the subdivision or service area for 100 years."⁵⁹ Under a "pay now" showing, the water provider or the developer must have both the legal right to the water and the physical infrastructure to deliver it

53. 2004 PLAN OF OPERATION, *supra* note 33, at 16–17, 32–33.

54. *Id.* at 35–36.

55. ARIZ. REV. STAT. ANN. § 45-576.02(C).

56. *Id.* § 48-3771(C) (allowing replenishment from CAP water and "any other lawfully available source except groundwater withdrawn from within an active management area").

57. *See* Glennon, *supra* note 4, at 682–88.

58. In this way, CAGRD has powers and authority similar to the municipalities that traditionally furnished Arizona's urban customers with water, but which most self-governed "Del Webb-style" master-planned communities that are developed outside the urban periphery have assiduously avoided to date. These master-planned communities are typically governed through covenants and restrictions and developer-controlled homeowners associations, not by elected officials.

59. 2004 PLAN OF OPERATION, *supra* note 33, at 2; ARIZ. ADMIN. CODE § R12-15-703(A) (2006).

before obtaining a Certificate of AWS,⁶⁰ and the complicated AWS rules only allow a limited amount of “mined” groundwater to be counted as part of this supply picture, even if it were “physically available.”⁶¹ Under the AWS rules, to prove consistency with the management goal in the “safe yield” AMAs, a water provider can only use limited amounts of groundwater, and DWR intends to allow even less reliance upon local groundwater supplies in the future.⁶² From a water management perspective, meeting these severe “pay now” requirements insures that the water supply portfolio for the service area determined to have an AWS would be secure for the next 100 years. The “pay later” approach to AWS compliance does not require as much up-front investment. Instead, a developer or water provider effectively contracts with CAGR D to find the water necessary to meet AWS consistency with management goal requirements, without any certain agreement for the source of the water supply or its price. These critical questions are left for resolution in the future.

The effort to comply with the GMA in advance of AWS rule approval led many established water providers to secure water supplies in advance of development and attempt to put them to use in advance of the AWS rules.⁶³ Such an approach was costly, up front, and required those developers and municipalities to secure more water, some of it under CAP subcontract, than they needed at the time. This forced some utilities to encumber substantial portions of their bonding or taxing authority to incur the necessary infrastructure costs to deliver the water to the area of use before DWR would issue an AWS approval, and some found these costs to be prohibitive. In securing large blocks of water without an immediate ability to use them, the traditional AWS providers contributed to the financial issues caused by the underutilization of CAP water and provided an inadvertent short-term source of supply for CAGR D.

In meeting its replenishment obligation, the most significant challenge for CAGR D is finding new sources of water because its primary source of renewable

60. DWR has been reluctant to approve water providers’ infrastructure for which bonding has been approved, but construction has not yet commenced.

61. ARIZ. ADMIN. CODE § R12-15-703. The percentage of mined groundwater that can support a 100 year water supply for a new subdivision is just 4% in the Phoenix AMA and 8% in the Tucson AMA. *Id.* § R12-15-703(G). In the Pinal AMA, where the management goal is planned depletion, as much as 125 gallons per person per day is allowable as mined groundwater. R12-15-703(H). DWR filed a rulemaking proposal on November 22, 2006, to change the Pinal Active Management Area AWS rules to require more use of renewable water supplies. A copy of the rulemaking proposal is available at http://www.azwater.gov/WaterManagement_2005/Content/OAAWS/default.asp (last visited Jan. 7, 2007). It should, therefore, come as no great surprise that subdivisions in Pinal County have heretofore rarely needed to join CAGR D to prove consistency with the management goal.

62. See ARIZ. ADMIN. CODE § R12-15-703(G), which contemplates the reduction of allowable groundwater withdrawals to zero upon the expiration of the Fifth Management Plan in 2025, pursuant to ARIZ. REV. STAT. ANN. § 45-568(A) (2006).

63. For example, Phoenix-area municipalities reacted to the draft AWS rules by buying large tracts of vacant land or farmland outside their respective AMAs, without any real assurance they would be able to deliver the water to their service areas. The scope and reasons for this temporary water-based land rush are beyond the scope of this Article.

water between 1995 and 2004 was unused or “excess” CAP water.⁶⁴ “Excess” CAP water is under contract for use by a water provider or Indian community or agricultural district but, although it may not be used in any given year, it may well be needed in the future to meet that contractor’s future water demand.⁶⁵ Excess CAP water will dwindle as the demand for CAP water by those holding the contracts or subcontracts increases and as municipal and agricultural water providers build the CAP delivery infrastructure necessary to use their secured water supplies. As the water supply historically used to meet CAGR’s current replenishment obligations is dwindling, CAGR’s new enrollment is expanding its future replenishment obligation. CAGR’s replenishment obligation has, in CAGR’s own words, “grown well beyond expectations.”⁶⁶ CAGR also faces increased costs as the competition for the limited supply of both excess CAP water and non-CAP water may dramatically increase prices.⁶⁷ As a consequence, CAGR and local municipalities may find themselves competing for the “next buckets” of water needed to meet demand in Arizona after the CAP supply has been fully used.

Unchecked ML enrollment poses a threat to the GMA’s sound water management principles. Under the GMA, the management goal for the Tucson and Phoenix AMAs⁶⁸ is “safe yield” by 2025.⁶⁹ In contrast, the Pinal AMA, where Cotton was King in 1980, is managed under the goal of what has been termed “planned depletion.”⁷⁰ Unchecked enrollment of MLs could result in the de facto transformation of “safe yield” water management into discrete areas of the “planned depletion” AMAs. To prove that water is “physically, legally, and continuously available” for the next 100 years under the AWS rules, an applicant

64. 2004 PLAN OF OPERATION, *supra* note 33, at 41.

65. There is a concise discussion of excess CAP water and its future availability in the 2004 PLAN OF OPERATION, *supra* note 33, at 42–45.

66. *Id.* at 41.

67. See RITA MAGUIRE, HERB DISHLIP & MICHAEL J. PEARCE, AN ANALYSIS OF THE WATER BUDGETS OF BUCKEYE, PAYSON, AND PRESCOTT VALLEY 1 (2005), available at <http://www.thinkaz.org/documents/AnAnalysisoftheWaterBudgets.pdf>. What may happen in Buckeye is that rapid development proceeds before the currently rural town has the ability to deal with it. There will be multiple water providers, all of whom are going to be depending on CAGR to obtain their renewable supplies for their AWS requirements.

68. Arizona Revised Statutes section 48-3771(B) provides that CAGR is obligated to replenish groundwater in the local AMA “in an amount equal to the groundwater replenishment obligation applicable to that parcel of member land. . . .” As a consequence, if there are groundwater shortages that result in reduced use of groundwater pumped from within the AMA, the replenishment obligation is also concurrently diminished.

69. ARIZ. REV. STAT. ANN. §§ 45-561(12), -562(A) (2006).

70. See *id.* § 45-562(B). The statutory goal is to “allow development of non-irrigation uses and to preserve existing agricultural economies in the AMA for as long as feasible, consistent with the necessity to preserve future water supplies for non-irrigation uses.” *Id.* In practice, the management goal for the Pinal AMA is commonly referenced as “planned depletion,” and the current AWS rules for the Pinal AMA contemplate pumping the aquifer to a depth of 1100 feet below land surface. ARIZ. ADMIN. CODE § R12-15-703(B)(1)(c) (2006). As mentioned in note 61, *supra*, the AWS rules for the Pinal AMA are currently undergoing revision, to require increased use of renewable water supplies.

for an AWS designation or certificate need only show that groundwater pumping in the local area will not cause water level declines of 1,000 feet below land surface or the depth of the bottom of the aquifer within the next 100 years, which is virtually the same standard for meeting the “planned depletion” management goal of the Pinal AMA.⁷¹

Depending on the depth to groundwater in the local area and the location of replenishment relative to pumping, significant water level declines may result. Declines in excess of even five feet per year are cause for concern about the long-term health of the regional aquifer, as reflected in DWR’s temporary well spacing rules, which apply even to the drilling of wells to recover recharge credits from within the area of hydrologic impact of a recharge project.⁷² DWR has already adopted rules for “dry lot” subdivisions that preclude drawdowns of 400 feet below land surface.⁷³

After a decade of CAGR’s operation, it has become apparent that there will be “wet” members and “dry” members of the District. “Wet” members are located in close proximity to CAGR’s recharge and delivery infrastructure, so that the member service area or the water provider serving an ML is pumping groundwater in reasonable proximity to the site of replenishment. In such areas, groundwater levels are likely to remain stable.⁷⁴ In other instances, the site of pumping is located far from the CAP delivery system and storage sites that CAGR has used, thus far, to meet its replenishment obligations. In these “dry” areas, the hydrologic effects of pumping are not mitigated by replenishment. The ability to pump is constrained only by DWR’s review and approval of a hydrologist’s finding that groundwater pumping for the water demands of CAGR members will not draw down the aquifer more than 1,000 feet below the surface. Even if the hydrologist has correctly predicted the drawdown levels of this pumping, the allowable long-term effects could be severe, and these severe effects

71. ARIZ. REV. STAT. ANN. § 45-576(J)(1). As mentioned in note 70, *supra*, the “planned depletion” standard is 1100 feet below land surface.

72. Under Arizona Revised Statutes section 45-834.01(B)(1), a recovery well permit is conditioned upon a showing the well will not “unreasonably increase damage to surrounding land or other water users from the concentration of wells.” This determination is to be made based on DWR’s so-called “well spacing and impact rules,” which were adopted in temporary form in 1983; newly proposed rules are currently wending their way through the regulatory approval process. Both the temporary rules and the proposed new rules are premised on the idea that additional drawdowns of two feet per year are acceptable and that drawdowns of between two and five feet per year are impacts that could cause unreasonable increasing damage to surrounding landowners. In developing the new rules, DWR reviewed groundwater elevation data, finding that water level declines in excess of two feet per year were not common over large areas of the AMAs and could therefore be considered “above normal and therefore unreasonable.” See 12 Ariz. Admin. Reg. 252 (Feb. 3, 2006).

73. ARIZ. ADMIN. CODE § R12-15-703(B)(1)(c).

74. In the Tucson AMA, the City of Tucson and the Town of Marana have water distribution infrastructure proximate to CAGR’s recharge facilities. For these MSAs, CAGR’s membership comports with hydrologic reality, in that it is almost certain that these MSAs will be able to recover their replenishment obligation for the future use of their customers.

would be worse if the hydrologist's predictions turned out to be optimistic. In the worst case scenario, when effects of local pumping in "dry" MLs are modeled incorrectly, CAGRDR membership offers no real assurance there will be water physically available to serve the particular subdivision in the future.

CAGRDR obliges members to replenish within the AMA where groundwater withdrawals occur, but CAGRDR does not, and cannot, guarantee that this replenished water will be actually hydrologically connected to the water originally withdrawn by the CAGRDR member. For example, if an ML were to draw down the local groundwater supplies in its immediate area to such an extent that it were forced to either curtail deliveries or seek emergency sources of supply, the replenishment obligation would simply diminish to the amount of groundwater pumping.⁷⁵ By contrast, the "traditional" or "pay now" AWS designation requires that (1) access to the renewable resource be demonstrated up-front and (2) storage and recovery as a mechanism for indirect utilization of renewable water comply with Management Plan provisions. In particular, wells cannot be permitted as recovery wells in the safe-yield AMAs if the drawdown is more than four feet per year.⁷⁶ These provisions essentially slow down any long-term declines in the local aquifer in the safe yield AMAs.⁷⁷

Arizona has a history of urban developments that have existed for over 100 years in core areas of Phoenix, Mesa, Tempe, Tucson, Bisbee, and Prescott, but little experience with pumping the local aquifers in CAGRDR's service area from depths close to 1,000 feet. As a matter of sound long-term water management, then, it would be prudent to ensure that there will be stable water supplies for Arizona's urban developments even past the 100-year window that the AWS program contemplates. It may be optimistic at best and foolhardy at worst to expect that the water needs of urban developments can be met by pumping water from depths approximating 1,000 feet below the surface.

V. OPTIONS AND SOLUTIONS

The high rate of growth of CAGRDR and its reliance, to date, on an ever diminishing source of supply—excess CAP water—pose a challenge to the generally sound water management principles of the GMA. Without some correction to the current course of action, CAGRDR will inexorably find itself required to accept additional members, but without sufficient long-term supplies to meet its replenishment obligations. By its very nature, this threat will grow more pressing with time. Associated with uncertainty in supplies is uncertainty in costs.

75. Arizona Revised Statutes section 48-3771(B) provides that CAGRDR is obligated to replenish groundwater in the local AMA "in an amount equal to the groundwater replenishment obligation applicable to that parcel of member land. . . ." As a consequence, if there are groundwater shortages that diminish supply, the replenishment obligation is also concurrently diminished.

76. See ARIZ. DEP'T OF WATER RES., THIRD MANAGEMENT PLAN, 2000–2010, TUCSON ACTIVE MANAGEMENT AREA, § 8-101, at 8–39 (Dec. 1999), available at http://www.water.az.gov/dwr/Content/Publications/files/ThirdMgmtPlan/tmp_final/default.htm#Tucson.

77. ARIZ. ADMIN. CODE §§ R12-15-705(G) to -705(H).

This is a concern for existing CAGRD members, be they MSAs or MLs. CAGRD is therefore ripe for reform. We suggest the following options:

A. Connect CAGRD with renewable water through the use of effluent from CAGRD Member Lands or Service Areas to meet replenishment obligations.

CAGRD has an obligation to meet the replenishment requirements of its members. The stakeholder process used to develop the 2004 Plan of Operation involved discussion of the extent to which long-term supplies should be under contract to CAGRD. Early concepts included as much as 80 percent of the replenishment obligation water portfolio being long-term in nature. The Plan of Operation that emerged included a much lower figure.⁷⁸ This matter should be revisited. One particularly attractive option relates to effluent associated with MLs.

It is reasonable to look to effluent as a water source of choice for CAGRD. As more homes are built in Arizona, more treated effluent will be available. Effluent that is treated, recharged into the underground aquifers, and then pumped for consumptive uses provides an excellent means to increase the available water supply. Public resistance to the use of treated effluent is a hurdle that must be overcome, but there have been some marked changes in water use and consumption in the past several decades, such as widespread adoption of low-flow toilets, development of drip-irrigation systems, and acceptance of Xeriscape, all of which suggest that the combination of marketing campaigns and water rate increases can, over time, alter customers' acceptance of different water conservation strategies.⁷⁹

Current Arizona law governs the ownership of effluent, and water quality regulations restrict its use.⁸⁰ Nevertheless, the opportunity to utilize effluent for replenishment purposes should be fully explored. Under *Arizona Public Service Co. v. Long*, the entity that treats the wastewater has the right to determine the use of the resulting treated effluent.⁸¹ Developers of new residential developments are signing on with wastewater companies only to find that the developer must "take

78. See 2004 PLAN OF OPERATION, *supra* note 33; CENT. ARIZ. GROUNDWATER REPLENISHMENT DIST., CAGRD PLAN OF OPERATION: CONCEPTUAL PLAN DISCUSSION PAPER (2003); Stakeholder Working Group Meeting Summaries for Feb. 13, 2004, Feb. 20, 2004, Mar. 12, 2004, and Mar. 19, 2004, available at <http://www.cap-az.com> (last visited Oct. 18, 2004).

79. See UNIV. OF ARIZ. WATER RES. RESEARCH CTR., WATER IN THE TUCSON AREAS: SEEKING SUSTAINABILITY 43–64 (1999).

80. The reuse of effluent is governed by the Arizona Department of Environmental Quality, which has authority under Arizona Revised Statutes section 49-203(A)(6) to promulgate effluent (reclaimed water) reuse rules. The rules establish water quality standards for several classifications of reclaimed water and the uses for which reclaimed water may be used. See generally ARIZ. ADMIN. CODE §§ R18-11-301 to -309 (water quality standards); *id.* §§ R18-9-701 to -709 (reuse and conveyance standards).

81. 773 P.2d 988, 996–97 (Ariz. 1989). The *Long* court essentially held that, in the absence of direct legislative authority governing the ownership of effluent, which did not exist at the time of *Long*, and has not been exercised since then, wastewater treatment plant operators have the right to control the use and disposition of effluent from their treatment plants. *Id.* at 997–98.

back” a percentage—sometimes as high as 70 percent—of the treated effluent generated by that community. What does a developer do with this large “return flow” of effluent? Depending on the number of housing units and the number of residents in each house, this quantity could exceed 600 acre-feet of water annually. To put this figure in perspective, a typical 18-hole golf course is roughly limited to 400 acre-feet per year under the current AMA management plans! By requiring a developer to take back the effluent generated, the developer must find a safe, efficient, and legal means of disposal. This creates a perverse incentive to install a turf-intensive, lush golf course, especially because golf course lots generally bring a higher premium! Although this may financially benefit the developer, the developer is not driving this decision.

Wastewater companies wish to be relieved of the burden of disposing of the supply of treated effluent. Imposing this obligation on the developer is an easy and cost-effective out. The current DWR management plans encourage developers to use effluent on golf courses. DWR limits and manages only groundwater use in its AMA Management Plans. The use of effluent, if it is the sole source of water, is unlimited. CAGRDR, in need of a renewable water supply, may not have access to this resource. Connecting CAGRDR to this resource may provide a solution to the ever increasing difficulty that CAGRDR will have in obtaining sufficient, cost-effective water to fulfill its current and future replenishment obligations. And the beauty of this solution is that the effluent supply grows proportionally with water use. Contrast this with a golf course, which often must rely on groundwater until the effluent supply is large enough to displace groundwater use.

Connecting CAGRDR with effluent could occur in any number of ways. Although legislation, DWR rules, and Arizona Corporation Commission regulations may need revision, the wastewater companies, CAGRDR, and developers would be wise to undertake the task of determining how best to connect the resource to the need. Each party has a real and acute stake in producing a viable outcome. Wastewater companies need an efficient means to dispose of effluent and CAGRDR needs access to renewable supplies of water. Options available include a partnership between wastewater companies and CAGRDR to dispose of the effluent. The disposal could be via transportation to existing recharge facilities or creating new recharge facilities near wastewater treatment plants and providing CAGRDR a right of first refusal to purchase the effluent. Developers and CAGRDR could partner to provide developers a means to dispose of wastewater it must “take back,” thereby providing a reduced enrollment fee and perhaps a reduced amount of tax to homeowners. Think of the marketing advantage to that homebuilder versus the one across the street who has not seen the wisdom of this option!

This option may be viable for smaller developments served by private wastewater collection and treatment systems, but probably not for CAGRDR members in the Tucson and Phoenix urban areas that are largely served by regional wastewater utilities. The effluent from those treatment plants generally belongs to the wastewater treatment plant operators, even if some of the treated wastewater

originated from other water providers or from CAWCD MLs.⁸² Effluent, whether put to immediate use in a reclaimed water distribution system or reserved for future potable reuse, is an important component of these municipalities' long-term AWS compliance efforts.⁸³ While this option has many complexities associated with it, the benefits associated support exploring it.

B. Mitigate the effects of the hydrologic disconnect between water pumping by CAGR members and replenishment by (1) locating replenishment closer to pumping or (2) demonstrating that groundwater decline as a result of member pumping will be less than 400 feet in the next 100 years.

This option attempts to address some of the water management implications associated with the growth in CAGR. Locating replenishment in close proximity to pumping was considered by the Governor's Water Management Commission during its deliberations. However, a recommendation did not emerge from this exercise.⁸⁴ Nevertheless, a policy regarding this is included in CAGR's Plan of Operation and the authorizing legislation provides that, "to the extent reasonably feasible," CAGR will replenish in the East and West sub-basins of the Phoenix AMA to the "approximate proportion" of replenishment obligation incurred in each sub-basin.⁸⁵ CAGR policy and practices to date do not obviate localized water level declines. This problem is not peculiar to CAGR. It is a manifestation of the GMA, whose water management goals consider water use on an AMA-basis rather than groundwater sub-basin. Due to average-cost pricing, CAGR has looked at replenishment options that are relatively low-cost in nature. Locating replenishment facilities closer to where pumping is occurring is likely to be very costly, but it is a question of pay now, or pay later.

The second sub-option would limit the allowable groundwater level decline to no more than 400 feet over a 100-year period. Arizona has had much more experience with the effects of decreasing the water table in localized areas by 400 feet than with pumping to 1,000 feet of decline. Though not optimal, these effects have largely proven to be manageable.⁸⁶ Water level declines to 1,000 feet

82. The *Long* court recognized that wastewater treatment plant operators may make agreements that transfer the right to use effluent. 773 P.2d at 997-98. In the Tucson area, Pima County operates the regional wastewater utility but the City of Tucson has a contractual right to most of the effluent, some of which was conveyed in trust to the Secretary of the Interior to settle Tohono O'odham water rights claims.

83. See, e.g., CITY OF TUCSON WATER DEP'T, WATER PLAN 2000-2050 ch. 4, at 13-17 (2004), available at <http://www.tucsonaz.gov/water/waterplan.htm>; CITY OF PHOENIX, WATER RES. PLAN 2005 UPDATE (2005). A summary of Phoenix's plan is available at the Phoenix Water Department Services website, <http://phoenix.gov/WATER/wrp2.jpg> (last visited Jan. 08, 2007).

84. See ARIZ. GOVERNOR'S WATER MGMT. COMM'N, FINAL REPORT, (2001) (hereinafter FINAL REPORT), available at <http://www.azwater.gov/dwr/Content/Publications/default.htm>. One of the Authors, Sharon Megdal, was a member of the commission and personally recalls the fact.

85. ARIZ. REV. STAT. ANN. § 48-3772(I) (2006).

86. Since 1940, groundwater levels in Central Tucson have declined more than 220 feet. U.S. GEOLOGICAL SURVEY & ARIZ. DEP'T OF WATER RES., TUCSON WATER: STATUS OF THE AQUIFER 6 (1998). Even with this 200-foot decline, there has been

below the surface over a 100-year period, however, are not consistent with sound long-term water management. We can preserve the most beneficial effects of CAGR, and minimize the negative consequences, by cutting the acceptable groundwater declines to 400 feet within the next 100 years. There are many parallels between after-the-fact replenishment for members of CAGR and before-the-fact storage of renewable water supplies for later recovery. This four-foot rate of draw-down equals the maximum rate of draw-down for permitting a well as a recovery well for stored water. Limiting draw-down for CAGR members would introduce water management considerations that are commensurate with the storage and recovery program and offer better protection to aquifers and the properties dependent on their use. If modeling showed that local groundwater pumping would cause declines in excess of 400 feet, the applicant could still obtain membership in CAGR by showing either reasonable hydrological proximity to CAGR delivery infrastructure or the ability to wheel water through other service areas to the ML. This sub-option would appear to be relatively easy to justify and implement.

C. Limitations on enrollment in CAGR and/or replenishment obligations

The main challenge facing CAGR is obviously the magnitude and growth rate of its replenishment obligations. Limitations on future replenishment obligations through policies relating to acceptance of new members or the size of the replenishment obligation for existing members (where possible) or future members should be fully explored. Perhaps water considerations should not drive growth policy, but sound water policy is essential to Arizona's long-term economic vitality. CAGR's planning requirements and membership enrollment provisions could be amended to require that enrollment of new MLs, new MSAs, or increases in the replenishment obligation of existing MSAs be available only if CAGR demonstrates "firm" supplies to meet an established percentage of the projected replenishment obligations of existing members. This would not resolve issues related to projected replenishment obligations of current members but could reduce additional growth that is dependent on CAGR replenishment. This limitation would not stop growth. Developers could obtain water sources on their own or locate developments in service areas that are not dependent on CAGR replenishment. It would limit Central Arizona's exposure to the risk associated with ever growing replenishment obligations for which there is no identifiable means of meeting those obligations.

A related, alternative option is to limit the replenishment obligations of current and future members. CAGR could modify its standard contracts to limit replenishment obligations for members of all types. Currently, replenishment

measurable subsidence, loss of water quality, and a drop in productivity from Tucson's supply wells. *Id.* In Pinal County, water level declines in the Eloy-Picacho area approach 300 feet. S.R. Anderson, *Potential for Aquifer Compaction, Land Subsidence, and Earth Fissures in the Tucson Basin, Pima County, Arizona*, in U.S. GEOLOGICAL SURVEY HYDROLOGIC INVESTIGATIONS ATLAS HA-713 (1988). Moreover, the effect of groundwater declines is not linear: "The rate of compaction and subsidence per foot of water level decline increased by an order of magnitude in the Eloy-Picacho area when water level declines exceeded a threshold of about 100 feet." *Id.* at Map 3.

obligations for most members are unlimited. For MLs, the upper bound for replenishment obligation is somewhat limited by the number of units in the development. For MSAs, however, the upper bound may be less constrained. Other members, such as Tucson and Scottsdale, face limits on the extent to which they can rely on CAGR. These limits were incorporated in the initial designations by ADWR. CAGR has limited its exposure for new MSAs that have enrolled in the past six years, as a water provider's service area cannot qualify for designation without an agreement executed by CAGR.⁸⁷ As a result, CAGR adopted the policy of placing upper limits on its obligations in all new MSA agreements. Doing the same thing for MLs would likely require modification of statutes and/or AWS rules. For MSAs, the CAGR contract should indicate that replenishment obligation limitations can be revisited when MSAs apply to extend their designations of AWS.

D. On behalf of its members, CAGR should cooperate with non-members to secure additional supplies.

The high growth rate of CAGR's replenishment obligation coincides with reductions in supplies of excess CAP water—the preferred source to date of replenishment water. CAGR has had excess CAP water available to it because those with higher priorities, primarily those with subcontracts to CAP water, have not yet grown into their allocations. As CAGR's replenishment needs grow and demand for CAP water by those ahead of CAGR in priority increases, “traditional” water interests and CAGR will attempt to obtain rights to the same water supplies to meet AWS requirements.⁸⁸

CAGR's 2004 Plan of Operation acknowledges that it must seek other sources of supply to meet future replenishment obligations. Sources for the “next buckets” of water include Non-Indian Agricultural Water (“NIA Water”), Indian Water Rights Settlement water, mainstem Colorado River water, water from sparsely populated basins west of Phoenix along the CAP canal, and effluent. Virtually all Arizona municipal water providers have cast a covetous eye on these water supplies to fill their future water needs. Many of these options require use of the CAP canal, which is controlled by CAWCD (the parent of CAGR). To date, only Scottsdale, through its Water Availability Status Membership in CAGR, has any claim to canal capacity for wheeling water.⁸⁹ Without access to the CAP canal, the infrastructure costs necessary to deliver these water supplies to a sole customer, even a large municipality, are prohibitive. In the immediate future, the issue of access to the CAP canal is at least as important as finding additional sources of supply.

Without a common pool of water supplies and funding, water providers would be placed in the difficult position of competing with other water suppliers

87. ARIZ. REV. STAT. ANN. § 48-3780(A)(8)(e) (2006).

88. The “first round” of designations largely occurred between 1996 and 2000.

89. 2004 PLAN OF OPERATION, *supra* note 33, at 8, 10. As part of Scottsdale's WSA membership, CAGR has committed to replenish 3,460 acre-feet annually in a designated area in northern Scottsdale. *Id.* at 10, fig. B-1.

for the next bucket of water.⁹⁰ There may be significant competition across regions as well as between CAGR D and non-members. Water supply acquisition to accommodate the needs of Central Arizona—and the State for that matter—is a collective concern. CAWCD’s Board of Directors recently approved a Strategic Plan that identifies developing new water supplies for the CAP three-county area as a strategic issue.⁹¹ CAWCD’s Board appears ready to take a more prominent role in addressing future water supply shortages in the tri-county service area in general, and for CAGR D members in particular.⁹² If CAWCD moves in this direction, it could use a variety of processes to allocate additional supplies. One method would be to allocate future supplies through the type of process that DWR used to recommend the distribution of existing CAP water subcontracts. Another method would be to use the current “water store for all customers” approach of CAGR D membership. A third alternative would be a market-based approach to allocate new supplies. At this point, the vehicle for cooperation may be unknown, but the imperative to avoid conflict is in the long-term interest of all Arizona water stakeholders.

E. More frequent scrutiny of the Plan of Operation and comparison of actual to projected replenishment by ADWR.

Legislation as complex as that establishing CAGR D as the replenishment agency for Central Arizona, a set of responsibilities and authorities housed at and governed by the CAWCD Board, may require modification over time. Following the recommendations of the Governor’s Water Management Commission,⁹³ the legislature authorized CAGR D to create a replenishment reserve and modified the requirements of the Plan of Operation.⁹⁴ Current law allows but does not require a mid-course review by the DWR Director.⁹⁵ Careful scrutiny of actual replenishment obligations relative to projected obligations is likely to be conducted by CAGR D staff and CAWCD’s Board. However, requiring a mid-course review would ensure that this is done. In fact, recent legislation requires a revised Plan of Operation if the Director of ADWR determines that there is either an unexpected increase in replenishment obligations or an unexpected decrease in the availability of water supplies identified in the Plan of Operation.⁹⁶ The Director may wish to

90. See FINAL REPORT, *supra* note 84.

91. See CENT. ARIZ. PROJECT, PROPOSED 2006 STRATEGIC PLAN (Aug. 3, 2006), available at <http://www.cap-az.com/management/meetings> (last visited Sept. 3, 2006).

92. In a public discussion of CAGR D issues on August 22, 2006, the Board indicated a willingness not only to continue its longstanding oversight of the Replenishment District, but also to seek greater authority over water supply issues. Minutes of the meeting are available at the Central Arizona Project website, <http://www.cap-az.com/management/meetings> (last visited Mar. 28, 2007).

93. FINAL REPORT, *supra* note 84.

94. 2004 PLAN OF OPERATION, *supra* note 33, at 4; see also, e.g., ARIZ. REV. STAT. ANN. §§ 45-576.03(N), (R)–(S) (2006), amended by 2003 Ariz. Sess. Laws ch. 155, § 3. These provisions require CAGR D to provide additional information about its water supplies in future Plans of Operation, and give the ADWR Director additional discretion to review a Plan of Operation during the decade following its adoption.

95. ARIZ. REV. STAT. ANN. §§ 45-576.03(R)–(S).

96. *Id.*

look more closely at making such a determination. Expiration of the Plan of Operation has serious implications for MSAs, including the loss of an MSA's Designation of AWS. Once platting is approved for an ML, development would not cease if the Plan of Operation expired.

CONCLUSION

CAGRDR has become a significant factor in Arizona's water management picture. It has the potential to become the most influential player in providing water for growth in the Phoenix-Casa Grande-Tucson megalopolis in the years to come. As enrollment increases and readily-available water to meet replenishment obligations diminishes, it will become increasingly more difficult to correct for CAGRDR's unintended flaws and to preserve its beneficial consequences. CAGRDR's initial (1995) replenishment obligation was 0.1 acre-foot, but before long CAGRDR's replenishment obligation will exceed the delivery obligations of the City of Tucson.⁹⁷ In 2035, CAGRDR's replenishment obligation for its three-county service area is projected to exceed the amount of non-Indian CAP water available to the entire Tucson AMA.

The GMA promise was to secure the long-term availability of groundwater for the AMAs, but unless we fix CAGRDR, and fix it soon, this promise is empty. Unfortunately, there is no panacea available to solve the issues discussed in this Article. Some of these issues are inherent in any effort to regulate the use of a common resource, but others arise directly from the fact that CAGRDR represents a political compromise: It came into being as a ready solution to the draconian requirements of the first AWS rules. To be sure, some of the possible options for addressing the unintended consequences of rapid growth in replenishment obligation coupled with limited identification of firm supplies could be implemented or pursued more readily than others. For example, we believe that it should be relatively simple to ensure more frequent scrutiny of the Plan of Operation. Other options are more difficult to implement. Contracting for effluent from new developments as a source of replenishment water appears to be a non-controversial option but is subject to various administrative and legal obstacles. Past experiences in cooperation among diverse water-using constituencies have laid the foundation for future cooperation to secure additional water supplies; however, the increasing acuteness of water scarcity threatens to strain these relationships. And, due to concerns about enacting water policies that would appear to limit growth, it is likely to be very difficult to amend the GMA to require limitations on either enrollment or replenishment obligations. There is one certainty about the future of groundwater management in Arizona: It will take creativity and persistence to develop the necessary agreements, statutes, and regulations to implement meaningful changes to CAGRDR's current method of operation.

97. Should current trends continue, this will occur sometime around 2025, when CAGRDR's 2004 Plan of Operation estimates a replenishment obligation of 205,200 acre-feet and Tucson Water's Demand at 201,709 AF. 2004 PLAN OF OPERATION, *supra* note 33, at tbl.C-1, tbl.D-10.