EXECUTIVE SUMMARY

March 5, 2021

Per the direction of the Governor's Water Augmentation, Innovation and Conservation Council, the Post-2025 AMAs Committee was formed in summer 2019 and charged with identifying challenges to water management within the Active Management Areas (AMAs) and generating strategies and solutions to address those challenges beyond 2025.

The Post-2025 AMAs Committee began its work with a shared understanding of what Arizona has achieved since the establishment of the 1980 Groundwater Management Act, which was enacted to conserve, protect, and allocate the use of groundwater resources of the state in order to protect and stabilize the general economy and welfare of the state and its citizens.[1] The programs and water management efforts that have evolved from the Act have successfully reduced groundwater overdraft across a series of five management periods. However, most of the AMAs have not met their goals, and the final management period closes in 2025. An imbalance between available water supplies and demand remains that will inevitably drive additional groundwater declines, particularly as pressures on the state's other water supplies increase.

Arizona's water management success over the last 40 years is due to the willingness of its stakeholders to face challenges, have difficult discussions, and develop strategies and policies to ensure its water future. The Post-2025 AMAs Committee seeks to continue that legacy, building upon the existing framework and successful programs, in order to strengthen water management and maintain the quality of life and the thriving economy that central Arizona's residents enjoy, well beyond 2025. The Governor's Water Council gives us the opportunity to consider, how can we work to ensure that after another 40 years, we will once again look back in appreciation of our state's ongoing stewardship of its water resources?

The Committee's approach has been to first identify, discuss, and build a foundational understanding of water management challenges and opportunities within the AMAs among its broad stakeholder representatives. Over the past year, the Committee identified six issues that represent a spectrum of opportunities to strengthen water management. The understanding gained from more than a year of discussion by the 100-plus participants will serve as the basis for the Committee to begin to develop potential strategies or solutions to address these water management challenges.

The six areas of opportunity to improve upon groundwater management are categorized as:

- the hydrologic disconnect,
- exempt wells,
- unreplenished groundwater withdrawals,
- groundwater in the Assured Water Supply Program,
- water supplies for replenishment of the Central Arizona Groundwater Replenishment District, and
- the post-2025 AMAs management structure.

Each challenge is described as succinctly as possible through an Issue Statement and supporting Issue Brief. The Post-2025 AMAs Committee may not be in unanimous agreement with all the points made and

[1] A.R.S. §45-401(B)

wording used within the Briefs, but there is concurrence that the statements should be presented to the Governor's Water Council so the Committee can progress to the next stage.

Although there are six individual Issue Briefs, the Committee acknowledges these issues are interconnected, and the challenge of securing and managing water supplies is shared by all sectors—municipal, agricultural, and industrial. The issues need to be considered together, and any potential strategies and solutions must be developed and weighed with this in mind. In addition, strategies and solutions will need to be assessed in relation to the immediate and long-term needs and consequences of the challenges presented in each of the six Briefs.

The Post-2025 AMAs Committee is seeking support from the Council that these six challenges facing the AMAs should be advanced to the Committee's next phase. The Committee will then delve into developing strategies and solutions to ensure the water management in the AMAs continues to protect and sustain the State's economy and well-being of its citizens far beyond 2025. The Committee is confident this can be realized through honest, objective and open discussion among the Committee members.

The following list provides the main Issue Statement included in each of the six Issue Briefs drafted by the Committee, which then follow this Executive Summary.

- **Hydrologic Disconnect:** The storage and recovery of water supplies in hydrologically disconnected areas within AMAs has the potential to create or worsen localized groundwater depletion. Similar issues may arise in the context of hydrologically disconnected pumping and replenishment to meet requirements of the Assured Water Supply Program.

- **Exempt Wells:** Exempt wells contribute to groundwater overdraft in the Prescott AMA, more so than in other AMAs, placing the long-term viability of its aquifers at greater risk and impeding the ability to reach the management goal in the Prescott AMA.

- **Unreplenished Groundwater Withdrawals:** In Arizona's active management areas, unreplenished groundwater withdrawals by all water-using sectors, as permitted by law, combined with a lack of sufficient incentives to either reduce withdrawals or mitigate the impacts, may limit the State's ability to meet the AMA long-term groundwater management goals.

- **Groundwater in the Assured Water Supply Program:** Large areas of the AMAs remain groundwater-dependent due to a lack of renewable water supplies and infrastructure, which creates uncertainties as groundwater supplies become more limited.
    - What are the role and consequences of the use of groundwater to support new growth after 2025?
    - What are the risks to homeowners whose physical groundwater supplies may be depleted after the regulatory Assured Water Supply 100-year timeframe?
    - What roadblocks prevent access to renewable supplies and infrastructure in these groundwater-dependent areas?

- **CAGRD Replenishment and Water Supplies:** The Central Arizona Groundwater Replenishment District (CAGRD) provides a mechanism to replenish some of the Assured Water Supply related

groundwater use within three Active Management Areas. However, the CAGRD and its members face long-term uncertainties related to the availability and costs of supplies for replenishment.
    - What are the long-term uncertainties for the CAGRD related to the availability of renewable supplies for replenishment?
    - What issues may arise as replenishment supply costs are borne by the CAGRD and passed on to its members?
    - What concerns exist about ADWR's oversight and review criteria of CAGRD Plans of Operation in relationship to the CAGRD's long-term viability?

- **AMA Management Structure:** There is no statutory provision establishing Active Management Area (AMA) goals or additional management periods and plans after 2025. The fifth management plans will remain in effect until statutory changes designate otherwise.

ISSUE BRIEF #1

HYDROLOGIC DISCONNECT

ISSUE STATEMENT

The storage and recovery of water supplies in hydrologically disconnected areas within AMAs has the potential to create or worsen localized groundwater depletion. Similar issues may arise in the context of hydrologically disconnected pumping and replenishment to meet requirements of the Assured Water Supply Program.

BACKGROUND

Recharge and Recovery

The storage of renewable water supplies underground is one of Arizona's key long-term water management tools. Across the five Active Management Areas (AMA), Arizona water users have stored (or saved through in-lieu storage) over 11 million acre-feet of water through 2017.[1] The storage of water underground, *recharge*, and the eventual withdrawal of that water, *recovery,* are administered through the Arizona Department of Water Resources' (ADWR) Recharge Program.[2]

Recharge is accomplished through storage at either an underground storage facility for which ADWR has issued a permit pursuant to A.R.S. § 45-811.01 or through the delivery of *in-lieu water* to a groundwater savings facility for which ADWR has issued a permit pursuant to A.R.S. § 45-812.01. When qualified water supplies are stored underground within an AMA those supplies can be recovered within the same calendar year via annual storage and recovery (AS&R) or, with certain exceptions, they can generate a long-term storage credit (LTSC) for recovery in future years.[3] Stored water retains its initial legal classification and is accounted as such when it is recovered. For instance, recharged Central Arizona Project (CAP) water that earns a LTSC will still be classified as CAP water when it is recovered at a later date. Recharged water is subject to physical losses as well as a *cut to the aquifer* depending on the type of water and method of storage. Typically, with some exceptions, there is a 5% cut to the aquifer for water stored at a recharge facility, which is intended to provide a general benefit to the aquifer from the recharge activity.[4]

Arizona's Recharge Program requires that the recovery of stored water, whether through AS&R or LTSC recovery, take place within the same AMA or groundwater basin where the water was originally stored. Additionally, with respect to the recovery of a LTSC, there is no statutory time limitation on how soon the water would need to be recovered after it was stored. This programmatic flexibility has incentivized the use of renewable supplies earlier and more extensively than would have otherwise occurred, but also allows for water to be stored underground in one location and recovered in a different location that is

[1] ADWR, LTSC Summary Dashboard https://new.azwater.gov/recharge/accounting.
[2] Broadly governed by regulations in statute (Title 45, Chapter 3.1) and ADWR policy.
[3] A.R.S. § 45-852.01
[4] https://new.azwater.gov/sites/default/files/media/Cut%20to%20the%20Aquifer%20Table_Revised_May_07_2019.pdf

spatially and hydrologically separate. The Phoenix AMA alone covers 5,646 square miles and contains seven distinct groundwater sub-basins.

Pumping and Replenishment

Arizona's Assured Water Supply (AWS) Program requires that new subdivision developments within AMAs have access to a water supply that is consistent with that AMA's statutory Management Goal. This requirement is satisfied by securing access to a renewable water supply or, if groundwater will be utilized, through membership in the Central Arizona Groundwater Replenishment District (CAGRD). Membership in the CAGRD allows those water users, including water providers or individual subdivisions, to utilize groundwater today, while the CAGRD finds renewable water supplies to *replenish* that volume of pumped groundwater through underground storage in the same AMA within three years of its use.[5]

Whereas recharging available renewable water supplies "up front" allows a water user to later recover that water under the legal classification in which it was stored, replenishment by the CAGRD serves to replace groundwater that has already been pumped by its members, so it is not intended for later recovery. However, similar to the recovery of a LTSC, replenishment may take place in a location hydrologically distinct from the area where groundwater was initially pumped. To date, the CAGRD has replenished over 500,000 AF of excess groundwater pumped by its members. In the current Plan of Operations, CAGRD estimated its annual replenishment obligation for current and future members could rise to 86,900 AF by 2034, though a recent review of CAGRD operations has shown that the replenishment obligation over the past four years has been lower than originally projected.[6]

THE HYDROLOGIC DISCONNECT

The ability to legally recover or replenish water that was respectively stored or pumped in a different location is referred to as the *hydrologic disconnect*. While artificial recharge of aquifers has led to a significant increase in water levels in certain areas, the hydrologic disconnect permits water users to pump water in areas that may not have benefited from recharge or replenishment tied to that pumping. For example, CAP water stored at a recharge facility in the Hassayampa sub-basin (located on the west end of the Phoenix AMA) can legally be recovered in the East Salt River Valley sub-basin, nearly 100 miles away. Similarly, CAGRD member lands that are served groundwater in the northern portion of the Tucson AMA currently have their pumping replenished at facilities located in hydrologically distinct regions in the west and southwest portions of the AMA.[7] The hydrologic disconnect can manifest even within nearby areas of the same aquifer, as demonstrated in the Prescott AMA where the vertical movement of recharge is impeded by natural geology that exists between the upper and lower units of the aquifer.[8]

In some instances, pumping groundwater that has been legally stored or replenished elsewhere in an AMA may exacerbate localized groundwater declines. In general, subsidence, fissuring, aquifer compaction, storage capacity loss, and water quality impacts are all potential consequences of groundwater depletion.[9] Localized overdraft also threatens economic growth, diminishing the physical availability of groundwater

[5] A.R.S. § 48-3771
[6] CAGRD Mid Plan Review https://www.cap-az.com/documents/departments/cagrd/2019-CAGRD-midplan-review-121119.pdf
[7] See map of CAGRD member lands – Figure 2.3, 2015 CAGRD Plan of Operation; Overview of CAGRD replenishment location and capacity – http://www.cap-az.com/documents/meetings/2019-03-21/1741-032119-WEB-Final-Packet-CAGRD.pdf
[8] See discussion throughout ADWR Modeling Report No. 25 on the aquitard separating the UAU and LAU. https://new.azwater.gov/sites/default/files/Prescott_AMA%20GW%20model%20report_3_31_2014_0.pdf
[9] "Ground-Water Depletion Across the Nation." USGS, 2003. https://pubs.usgs.gov/fs/fs-103-03/JBartolinoFS(2.13.04).pdf.

in certain areas and reducing the likelihood that new development can secure an AWS determination. Stakeholders in the Arizona water community have also expressed concerns regarding the vulnerability of stored water to be diminished by the groundwater withdrawals of other users. In other cases, recharge or replenishment sites must be managed to account for rising, rather than falling, groundwater levels. These conditions may present their own array of problems, from waterlogging to limiting the amount of water that can be stored at a recharge facility.[10]

Though conversations surrounding the hydrologic disconnect primarily focus on negative consequences, there are also situations in which net benefits to an area or aquifer could be gained. For instance, by recharging or replenishing in a location with declining groundwater levels, and pumping where shallow groundwater is problematic, the hydrologic disconnect can have a positive impact. It is also worth noting that the majority of groundwater pumping within AMAs is not related to recovery or replenishment, and problematic rises or declines in groundwater levels often occur from water use or management practices separate from the hydrologic disconnect.

There is a lack of comprehensive analysis or documentation as to the exact extent to which the hydrologic disconnect will impact groundwater conditions. For example, significant uncertainty exists with regard to the timing, location, and volume of future LTSC recovery in the AMAs, making it difficult to predict the scale of its impact to groundwater conditions. Nevertheless, there is little question that a large and persistent disconnect between recharge and recovery could lead to localized issues. Existing empirical data and modeling related to other water management efforts suggest that in certain cases there is a significant benefit to aligning the withdrawals of groundwater to the location of recharge and replenishment.

One example includes the improvement of groundwater levels in recent years at the Tucson Water Central Wellfield area, located within the Upper Santa Cruz sub-basin. Groundwater pumping significantly increased at the Central Wellfield during the period between 1970 – 2000, peaking at over 73,000 AF/year. In the year 2000, Tucson Water initiated pumping in the Avra Valley area, where recharge of Central Arizona Project water was occurring. Over the following two decades, pumping in the Avra Valley has significantly increased, with a corresponding reduction in pumping at the Central Wellfield. During this same time period, water levels have increased throughout the Central Wellfield area as much as 50 feet, and land subsidence rates have decreased.[11]

In the Phoenix AMA, groundwater modeling conducted by ADWR in 2010 for AWS purposes also shed some light on the potential impacts of linking recharge with recovery. In the final modeling scenario, projections for future recovery and replenishment were shifted to locations closer to where water was originally stored or pumped.[12] These modeling assumptions had the effect of reducing the severity of projected groundwater declines in certain areas of the regional aquifer.[13] Although the assumptions improved model outcomes, actual implementation of those recovery and replenishment regimes could potentially be limited by permitting regulations and storage capacity constraints.

[10] For example, recharge at the Granite Reef Underground Storage Project is often curtailed as rising groundwater levels trigger regulatory alert levels designed to prevent encroachment on a nearby landfill.
[11] ADWR correspondence with Tucson Water. April 2, 2020. Also see Tucson 4MP, Section 8.3.
[12] ADWR Modeling Report No. 22, Section 8.0, pg 65. https://new.azwater.gov/sites/default/files/Modeling_Report_22_2.pdf.
[13] Ibid., Section 8.5, pg 74; Section 9.0, pg 75. Pg. 21.

POLICIES & EFFORTS TO ADDRESS THE HYDROLOGIC DISCONNECT

Crafting policy to specifically address the hydrologic disconnect has been a long-running discussion in the Arizona water community and part of a broader set of initiatives to address localized groundwater declines. The need for sub-regional groundwater management strategies was identified as a priority for ADWR as early as 1999 in the Third Management plans.[14] The hydrologic disconnect relating to CAGRD's replenishment has been recognized as an issue by the Central Arizona Water Conservation District Board which has directed the CAGRD "to the extent feasible, replenish in areas of hydrologic impact of groundwater withdrawals by CAGRD members" in its last two Strategic Plans.[15] CAGRD has implemented that direction, but in some cases, as with water users, it is limited by recharge facility location and available storage capacity.

More recent attempts to address the hydrologic disconnect took place through stakeholder engagement led by ADWR in 2012 as part of initial efforts to develop the Fourth Management Plans. While concepts for adjusting the cut to the aquifer and designating certain sub-basins for targeted management were proposed, no policies were ultimately adopted due to lack of consensus on a path forward.

Several policy and regulatory requirements exist that govern the location of recovery and replenishment which may also so serve to mitigate some of the impacts stemming from the hydrologic disconnect:

1. ADWR's well spacing requirements prohibit recovery of stored water in some situations if, among other things, the recovery would lead to ≥ 10 feet of drawdown at another well within the first five years of recovery or would exacerbate existing subsidence issues.[16]
2. The AMA Management Plans prohibit recovery of water in an area experiencing ≥ 4.0 feet of average annual decline in groundwater levels.[17]
3. Recovery within the area of impact is considered physically available for assured water supply purposes. Physical availability for recovery that takes place outside of the area of impact must be demonstrated.[18]
4. Statute requires the CAGRD to replenish groundwater in the East and West portions of the Phoenix AMA in proportion to the replenishment obligation generated in each portion of the AMA, to the extent reasonably feasible.[19]

While these policies do have bearing on the location of recovery and replenishment, they do not provide an overall framework for water management tailored for sub-AMA application and their effectiveness in specifically mitigating localized groundwater has not been well established.

The complexity and breadth of the issue must be taken into consideration when attempting to address problems that may stem from the hydrologic disconnect. As described previously, there are cases where

[14] Phoenix 3MP – Sec. 8.2; Tucson 3MP - Sec 8.7.2.3; Pinal 3MP - Sec 8.6; Prescott 3MP – Sec 8.2
[15] CAWCD Board of Directors Strategic Plan, 2016. https://www.cap-az.com/documents/board/StrategicPlan-2016.pdf, 2010 Strategic Plan, http://www.cap-az.com/documents/board/Strategic-Plan-2010.pdf.
[16] A.A.C. R12-15-1302.
[17] See 4MP (Phoenix AMA, Section 8-801; Tucson AMA, Section 8-901; Prescott AMA Section 8-901).
[18] A.A.C. R12-15-716.
[19] A.R.S. § 48-3772(I).

storing water in areas with groundwater declines and recovering those credits in locations with shallow groundwater actually benefit aquifer conditions. In addition, the scale and distribution of the problem is extremely localized, differing between AMAs and even within the sub-basin level. Ultimately, proposals for solutions related to the hydrologic disconnect should remain flexible enough to account for the variability in local groundwater conditions and management practices in different areas.

ISSUE BRIEF #2

EXEMPT WELLS

ISSUE STATEMENT

Exempt wells contribute to groundwater overdraft in the Prescott Active Management Area (AMA), more so than in other AMAs, placing the long-term viability of its aquifers at greater risk and impeding the ability to reach the management goal in the Prescott AMA.

BACKGROUND

Per A.R.S. § 45-454, wells pumping 35 gallons per minute or less to serve non-irrigation uses ("exempt wells") are generally exempt from groundwater regulations, including metering, water use reporting and water conservation requirements. Concern about the administrative burden of regulating thousands of small wells and the belief that they would have a negligible impact on the aquifer led the state legislature to exempt this category of groundwater use from the 1980 Groundwater Management Act (GMA).[1] With respect to the requirements of the GMA, there are several provisions that apply to exempt well owners:

1. Exempt wells may not pump more than 35 gallons per minute.
2. If used for commercial or industrial purposes, exempt wells drilled on or after April 28, 1983 cannot pump more than 10 acre-feet per year.
3. Exempt wells may not be used to grow crops on two or more acres of land.
4. New exempt wells cannot be drilled within 100 feet of a designated water provider's operating distribution system unless one of the criteria for an exemption is met.
5. Within the AMAs, dry lot subdivisions intending to drill exempt wells must obtain a certificate of assured water supply (AWS). To do so, they must demonstrate, among other things, that the groundwater will be physically and continuously available for 100 years (the depth to groundwater cannot exceed 400 feet) and that the groundwater supply meets water quality requirements or that the groundwater will meet those requirements after treatment required by law.[2,3] Dry lot subdivisions with more than 20 lots must demonstrate that the groundwater use will be consistent with the management goal of the AMA. In the Prescott AMA, this is typically demonstrated through the use of extinguishment credits. Also, the application for the AWS certificate must show that a well will be drilled on each individual lot, with no well sharing.

Before drilling an exempt well, the well owner is not required to demonstrate physical or legal availability of the groundwater supply, with the exception of the dry lot subdivision provision noted above. Property owners often drill exempt wells because they are the least expensive alternative for a water supply, or because they avoid the regulatory requirements of other water supply options. For example, with limited options for subdivisions of more than 20 lots, in order to demonstrate consistency with the AMA management goal of safe-yield in the Prescott AMA, property owners may find the AWS requirements

[1] Prescott Active Management Area Groundwater Users Advisory Council Safe-Yield Subcommittee. (2006). Final Report on Safe-Yield Impediments, Opportunities, and Strategic Directive.
[2] *Id*.
[3] Arizona Administrative Code, Title 12, Chapter 15, Section 719.

leave little choice but to downsize their development plan to avoid the AWS requirements. One significant downside to exempt wells is they do not provide an assurance of a long-term water supply to a property or homeowner.[4] In the context of reaching the Prescott AMA's management goal, the proliferation of exempt wells contributes to groundwater overdraft, since they are exempt from the GMA requirements that aim to drive the AMA toward the goal of safe-yield. Exempt wells can only contribute to overdraft because there is no requirement to offset their withdrawals, and there is no incidental recharge attributed to the end use of the water supplied by exempt wells.

Additionally, under the Arizona Department of Water Resources' (ADWR) well spacing rules, exempt wells have an impact on the siting of non-exempt wells, even though the rules do not apply to exempt wells. Specifically, ADWR will not permit a new well (including a non-exempt well operated by a municipal provider) if withdrawals from the proposed well will exceed 10 feet of additional drawdown of water levels at neighboring wells after the first five years of operation.[5] In the case of siting a recovery well, the well may not be located in an area experiencing an average annual rate of decline in water levels that is 4 feet or greater.[6] While these rules to not apply to exempt wells, their concentrated existence in some areas may have a significant impact on local water providers who may need to extend their infrastructure further to avoid such conflicts. In other words, exempt wells are afforded protections from the spacing requirements placed on other wells, yet they remain unregulated.

EXEMPT WELLS IN THE PRESCOTT AMA

Within Arizona, the Prescott AMA contains the highest density of exempt wells.[7] Approximately 12% of the State's exempt wells are located in a basin comprising less than 0.5% of the State's area.[8,9] Narrowed even further, the Prescott AMA contains 30% of the exempt wells in all five AMAs but represents only 3% of AMA land area.[10] The number of exempt wells registered in the Prescott AMA steadily increased through approximately 2006, but have more recently leveled off.[11] According to ADWR, there are now over 12,900 exempt wells in the Prescott AMA, estimated to serve approximately 25,000 people.[12,13]

ADWR creates estimates of exempt well withdrawals each year based on the number of people in an AMA that are not served by municipal water providers. The estimated withdrawals of exempt domestic wells in the Prescott AMA totaled just over 2,500 acre-feet in 2017. With total water demand in the AMA at approximately 23,000 AF that year, this pumping represents approximately 11% of the total AMA water demand.[14] However, the potential pumping capacity of Prescott AMA exempt wells totals over 150,000

---

[4] Prescott Active Management Area Groundwater Users Advisory Council Safe-Yield Subcommittee. (2006). Final Report on Safe-Yield Impediments, Opportunities, and Strategic Directive.
[5] Arizona Administrative Code, Title 12, Chapter 15, Section 1302.
[6] See Prescott AMA (2012), Phoenix AMA (2020), and Tucson AMA (2016) Fourth Management Plans, section 8-901; see DRAFT Pinal Active Management Area Fourth Management Plan (2020), section 8-901.
[7] Town of Prescott Valley. (2020). Rainwater Harvesting for Aquifer Recharge Final Report.
[8] *Id*.
[9] Arizona Department of Water Resources. (2020). Non-Exempt Wells by AMA. [Data Set]. Provided by Natalie Mast via email on January 15, 2020.
[10] *Id*.
[11] Prescott Active Management Area Fourth Management Plan 3-5 (2012).
[12] *Id*.
[13] Arizona Department of Water Resources. (2020). Prescott AMA Annual Supply and Demand Data, Historic Template and Summary. Accessed March 11, 2020 from http://infoshare.azwater.gov/docushare/dsweb/Get/Document-10673/Prescott%20AMA%20Historic%20Template%20and%20Summary%20for%20web.xlsx.
[14] *Id*.

acre-feet per year.[15] That is, if all 12,900 exempt wells were to pump at their registered capacity over the course of a year, they would extract 150,000 acre-feet of groundwater. Exempt well owners are not required to report to ADWR so the exact number of wells in operation and their annual withdrawals are unknown. Since pumping at even 20% of that capacity would be greater than the AMA's current overall demand, potential pumping capacity illustrates that existing exempt wells could represent a large source of groundwater withdrawals in the future. In recent years, ADWR has estimated an increase in Prescott AMA exempt well pumping of approximately 4% per year based on population growth, so the future impact of the number and pumping capacity of exempt wells on unregulated groundwater use remains to be seen.[16]

In contrast, the proportion of water used by exempt wells in other AMAs is much smaller. For instance, Phoenix AMA groundwater pumping by exempt wells is estimated at less than 1% of total water use.[17] So, while exempt wells may become a regional concern in areas like the Prescott AMA, their proliferation is not considered one of the top water issues in the other AMAs.[18]

FURTHER CONCERNS ABOUT EXEMPT WELLS

Exempt wells continue to pose challenges to water management in a safe-yield AMA like the Prescott AMA that currently has no imported water supplies, and these challenges will only grow over time. As renewable water supplies that meet the State's AWS requirements for planned subdivisions become more difficult to obtain, some developers have attempted to avoid the AWS requirements by selling land through lot splits of five or fewer lots, with the purchasers drilling a new exempt well to access groundwater.[19] However, it should be noted that these lot splits, commonly known as "wildcat lot splits," may constitute an illegal subdivision if they are part of a series of lot splits that constitute a "common promotional plan."[20]

Over time, some effects of groundwater overdraft have been subtle. Some property owners with exempt wells drilled in the past have found they need to deepen their wells to access groundwater.[21] Other wells have gone dry, leading property owners to rely on nearby water providers for hauled water. Uncertainty and concerns are mounting about the quality of water that will inevitably need to be pumped from greater depths. Without action, concern exists that these impacts can lead to diminishing property values and a loss of property tax revenues, while regional infrastructure costs simultaneously increase in order to develop alternative water supplies where feasible. Numerous studies and committees have proposed regulatory structures to limit exempt wells and their impact to both the long-term health of aquifers and

[15] Arizona Department of Water Resources. (2020). Non-Exempt Wells by AMA. [Data Set]. Provided by Natalie Mast via email on January 15, 2020.
[16] Arizona Department of Water Resources. (2020). Prescott AMA Annual Supply and Demand Data, Historic Template and Summary. Accessed March 11, 2020 from http://infoshare.azwater.gov/docushare/dsweb/Get/Document-10673/Prescott%20AMA%20Historic%20Template%20and%20Summary%20for%20web.xlsx.
[17] Arizona Department of Water Resources. (2020). Phoenix AMA Annual Supply and Demand Data, Historic Template and Summary. Accessed March 11, 2020 from http://infoshare.azwater.gov/docushare/dsweb/Get/Document-10671/Phoenix%20AMA%20Historic%20Template%20and%20Summary%20for%20web.xlsx.
[18] Prescott Active Management Area Groundwater Users Advisory Council Safe-Yield Subcommittee. (2006). Final Report on Safe-Yield Impediments, Opportunities, and Strategic Directive.
[19] Prescott Active Management Area Groundwater Users Advisory Council Safe-Yield Subcommittee. (2006). Final Report on Safe-Yield Impediments, Opportunities, and Strategic Directive.
[20] A.R.S. § 32-2101(15).
[21] Upper Verde River Watershed Protection Coalition. (2010). Safe Yield Work Group Final Report.

sustainable water resource management.[22] While no such regulatory proposals have proved politically feasible, the Prescott AMA has moved forward in developing incentive programs that could serve as a model for reasonable solutions[23]. In order to address exempt well-related issues, it may be best to first seek solutions that specifically address concerns and issues in the Prescott AMA.

[22] Upper Verde River Watershed Protection Coalition Board. (2018). Minutes of The Upper Verde River Watershed Protection Coalition Board Held on January 24, 2018.

[23] For example, the Upper Verde River Watershed Protection Coalition and Town of Prescott Valley have implemented a pilot program for exempt well owners to capture and replenish rainwater to offset overdraft caused by exempt well pumping. Initial project findings demonstrated that rainwater harvesting and aquifer recharge has the potential to represent one-third to one-half of the annual water budget of an average residence on an exempt well, such that groundwater overdraft could be offset by installing a rooftop rainwater harvesting system in the Prescott AMA. (Town of Prescott Valley. (2020). Rainwater Harvesting for Aquifer Recharge Final Report.)

ISSUE BRIEF #3

UNREPLENISHED GROUNDWATER WITHDRAWALS

ISSUE STATEMENT

In Arizona's active management areas (AMAs), unreplenished groundwater withdrawals by all water-using sectors, as permitted by law, combined with a lack of sufficient incentives to either reduce withdrawals or mitigate the impacts, may limit the State's ability to meet the AMA long-term groundwater management goals.

BACKGROUND

Unreplenished groundwater withdrawals refer to groundwater that is legally withdrawn **without requirement or obligation** to artificially replenish or replace that volume of water back into the aquifer and is not offset by incidental recharge. These withdrawals are also referred to as 'allowable groundwater.' Through Arizona's current regulatory framework, the State has sought to restrict the overall reliance on non-renewable groundwater supplies. The 1980 Groundwater Management Act (GMA or Code) was passed to specifically address issues associated with severe groundwater overdraft. The GMA established the Arizona Department of Water Resources (ADWR) to oversee the State-wide water planning and regulations and created AMAs where groundwater would be regulated by ADWR in order to reduce groundwater withdrawals.

The State's approach to groundwater management includes requiring new development in the AMAs to limit the amount of groundwater that may be pumped without replenishing the aquifer through recharge of a renewable supply, and water users in all sectors are subject to mandatory conservation requirements that aim to reduce the amount of groundwater used over time. Despite these requirements, various existing and new groundwater users within the AMAs are allowed to continue or increase their use of unreplenished groundwater over time. Existing groundwater use was grandfathered into the Code, and other exceptions were made that allow for the continued use of groundwater in all sectors. Since, by definition unreplenished groundwater withdrawals are not required to be replenished, withdrawals that exceed natural and incidental recharge contribute to overdraft.

UNREPLENISHED GROUNDWATER WITHDRAWALS BY SECTOR

Groundwater use is authorized under various rights and permits within each water-using sector. The sectors and the types of current and ongoing allowable groundwater withdrawals are described below. **Table 1** also provides data on recent groundwater demands and unreplenished groundwater withdrawals by sector and AMA to assist in developing a common understanding of groundwater demands in the AMAs on which to base future conversations and decisions.

Agricultural Sector

As part of the adoption of the Code, Irrigation Grandfathered Groundwater Rights (IGFRs) were granted that allow growers to withdraw groundwater for irrigation use. No new IGFRs may be created and land that may be irrigated is limited to that which was historically irrigated between January 1, 1975 and

January 1, 1980.[1] IGFRs represent a perpetual authority to withdraw groundwater without a replenishment requirement. This type of groundwater withdrawal can be expected to continue as long as the land is used for agricultural purposes. This is because the cost of groundwater pumping is generally less expensive than the costs associated with delivering and using renewable supplies, when they are available.[2] The agricultural sector does not have a replenishment requirement, but some replenishment occurs after water is applied to crops and percolates below the root zone and reaches an aquifer. This replenishment is known as incidental recharge. The agricultural sector also includes estimated groundwater demands associated with tribal agricultural uses.

Some irrigation districts and farming operations delivering water to IGFRs serve as groundwater savings facilities (GSFs), enabling them to utilize renewable water supplies in lieu of groundwater in a given year. However, for water accounting purposes, ADWR legally considers the irrigation district's use of the renewable supply to be groundwater, because the volume of groundwater saved becomes stored water for the entity supplying the water. The stored water then becomes a long-term storage credit, reserved for future pumping, or it can be recovered within the same year. The GSF operation functionally reduces the amount of groundwater in storage equivalent to the amount of renewable water used on the farm, less a statutorily-required 5% cut to the aquifer, even though physical pumping may not occur for years to come.

In the West Salt River Valley Sub-basin of the Phoenix AMA, the Buckeye Water Logged Area was established in 1988 to exempt three agricultural districts in the area from conservation requirements and exempt others pumping groundwater pursuant to IGFRs from meeting irrigation water duties or paying groundwater withdrawal fees.[3] They are responsible for paying a water duty exemption fee of twenty-five cents per irrigation acre per year for each irrigation acre in the exempted area.[4] These exemptions allow water users to drain and dewater the area to address the shallow depth to groundwater that would otherwise prevent crop growth and to manage the high salinity of the groundwater.[5] Although withdrawals from the Buckeye Water Logged Area are incentivized, they contribute to groundwater overdraft and are included in this summary of agricultural groundwater demands.

Municipal Sector

The municipal sector is comprised of small and large municipal water providers, both publicly- and privately-owned and both with and without a designation of Assured Water Supply (AWS). Small municipal providers are those that use 250 acre-feet (AF) or less water per year.[6] Thus, large providers are those that use more than 250 AF of water per year. In addition to these provider types, several entities are regulated as large untreated providers in the Phoenix AMA. These include cities, towns, private-water companies and irrigation districts that serve 100 or more AF per year or 500 or more people with untreated water for non-irrigation purposes, usually for residential or commercial flood irrigation of turf.[7]

Under the AWS Program, the municipal sector is required to develop and utilize renewable water supplies for future growth.[8] However, existing municipal groundwater uses are exempt from this requirement, unless a water provider serving existing demands chooses to become designated as having an AWS. In the

[1] A.R.S. § 45-452(A).
[2] Phoenix Active Management Area Fourth Management Plan 11-3 (2020).
[3] A.R.S. § 45-411.01.
[4] A.R.S. § 45-411.01(D).
[5] Phoenix Active Management Area Fourth Management Plan 2-15 (2020).
[6] *Id.* at 5-3.
[7] *Id*. at 3-10.
[8] Phoenix Active Management Area Third Management Plan 12-2 (1999).

Phoenix, Pinal, Tucson and Prescott AMAs, a groundwater allowance is permitted and extinguishment credits may be pledged to offset new groundwater withdrawals. It should be noted that all allowable groundwater pumping by designated municipal water providers is limited by the physical availability of groundwater in their service area. Also, the Santa Cruz AMA was split off from the Tucson AMA around the same time that ADWR adopted AWS rules for the other AMAs, and ADWR has not yet adopted AWS rules for the Santa Cruz AMA. Because of this, all groundwater use is unreplenished in the Santa Cruz AMA.

Pre-1995 Subdivisions –Subdivisions platted before the 1995 AWS Rules and served by undesignated water providers are allowed to use groundwater without replenishment.

Groundwater Allowance – Another type of municipal unreplenished groundwater withdrawal is the 'groundwater allowance' granted upon issuance of a Certificate or Designation of Assured Water Supply (CAWS or DAWS). Under the AWS Rules, a predetermined volume of groundwater can be withdrawn by the CAWS holder or DAWS provider and not be replenished or offset. This groundwater allowance, also referred to as 'Phase-in Credits' in some Designations, was initially designed to help municipal providers transition from groundwater to renewable supplies.[9,10] Whether a DAWS includes a groundwater allowance, and the manner in which the groundwater allowance is calculated, depends on the AMA in which the provider is located and the date on which the provider either began serving customers or applied for the DAWS. The groundwater allowances for some DAWS in the Pinal and Prescott AMAs are relatively large because they include a volume of groundwater equivalent to the demands of subdivisions platted in those AMAs before a certain date (2007 for the Pinal AMA and 1999 for the Prescott AMA).

For CAWS in the Phoenix, Prescott and Tucson AMAs, the groundwater allowance is gradually reduced over time depending on the date of application until it goes away completely for applications filed beginning in 2025. As a result of an amendment of ADWR's AWS Rules effective January 1, 2019, applications for CAWS in the Pinal AMA no longer receive a groundwater allowance. Designated providers in the Phoenix, Pinal, and Tucson AMAs are also allowed an annual addition to the groundwater allowance typically equal to 4% of total demand, based on the assumption that this volume is being returned to the aquifer via incidental recharge associated with the provider's service area.[11] In recent years, groundwater allowances have been utilized by designated and undesignated providers in the four AMAs where they are available.

Extinguishment Credits – Existing agricultural IGFRs, Type 1 non-irrigation GFRs and Type 2 non-irrigation GFRs may be extinguished for credits, known as 'extinguishment credits', and pledged to a DAWS or CAWS located in the same AMA. Credits pledged to a DAWS or CAWS are added to any groundwater allowance associated with the DAWS or CAWS and thus not subject to replenishment.[12] The method of calculating extinguishment credits varies by AMA, as described in the AWS Rules.[5,13] Also, GFRs in the Phoenix, Prescott and Tucson AMAs may be extinguished for extinguishment credits only until 2025. While the use of extinguishment credits contributes to unreplenished groundwater pumping, it does not add to net groundwater withdrawals if the owner of the original grandfathered rights would have continued to withdraw groundwater pursuant to the right if it had not been extinguished; in practice, extinguishment credits represent a reduction in previously allowable withdrawals.

[9] Prescott Active Management Area Fourth Management Plan 10-8 (2019).
[10] Phoenix Active Management Area Fourth Management Plan 11-4 (2020).
[11] Arizona Administrative Code, Title 12, Chapter 15, Sections 724(A)(4), 725(3), and 727(A)(4).
[12] Arizona Administrative Code, Title 12, Chapter 15, Section 723.
[13] Arizona Administrative Code, Title 12, Chapter 15, Sections 724, 725.01, 726 and 727.

Exempt Wells – Pumping from exempt wells, limited to not more than 35 gallons per minute, is not regulated by ADWR and therefore is not required to be measured or subject to conservation requirements. Exempt wells are largely, but not exclusively, for domestic use. The volume of pumping associated with these small wells contributes to the overall amount of unreplenished groundwater in all AMAs. ADWR creates estimates for these withdrawals each year based on the number of people in that AMA that are not served by municipal water providers.

Remediated Groundwater – Until 2025, pumping of 'remediated groundwater' is incentivized in order to facilitate the treatment and beneficial use of contaminated groundwater. The use of remediated groundwater by certain designated providers in the Phoenix and Tucson AMAs is deemed consistent with the AMA's management goal and thus not subject to replenishment.[14] Also, remediated groundwater is counted the same as surface water in determining compliance with Management Plan conservation requirements. Although remediated groundwater use is treated the same as surface water use for these purposes, it retains its legal character as groundwater, and therefore contributes to overdraft in the AMAs where it is withdrawn.

Industrial Sector

The Code defines industrial use as a non-irrigation use of water, not supplied by a city, town or private-water company, including animal industry use such as dairies and feedlots, and expansions of those uses.[15] The industrial sector has no renewable water resource requirements, yet it is expected to grow along with municipal growth as it is largely dependent on population growth and the economy.[16,17] The sector includes electric power plants, sand and gravel facilities, turf facilities[18], mining, dairy, cattle feedlots, and other industrial uses. Industrial water users receive water from a number of sources, including surface water, Central Arizona Project water, effluent, and groundwater. Pre-Code industrial groundwater users are allowed to withdraw water from their own wells under grandfathered rights. Under certain circumstances, new industrial groundwater users may acquire groundwater withdrawal permits, including general industrial use permits, from ADWR. They also may purchase or lease non-irrigation GFRs, which are an authority to pump groundwater for non-irrigation use (e.g., Type 1 and Type 2 non-irrigation GFRs). Many of the industrial subsectors utilize a combination of these authorities. As described in relation to extinguishment credits above, the utilization of Type 1 rights represents a reduction in allowable groundwater mining under the Code, because the converted right is likely a lesser volume than would have been utilized by the original IGFR holder. Although there are incentives for utilizing renewable supplies like effluent, there is no regulatory or statutory authority at this time to require industrial water users to convert to renewable supplies or replenish their groundwater use.[19]

Summary of Unreplenished Demand by Sector

Table 1 provides a breakout of 2012 through 2016 average annual groundwater demand pursuant to the unreplenished groundwater uses described in this brief, by sector and AMA. These values include groundwater demands such as pumping and GSF demand, but do not include the recovery of water stored underground and not legally classified as groundwater, such as effluent that had been stored for long-

[14] Arizona Administrative Code, Title 12, Chapter 15, Section 729.
[15] A.R.S. § 45-561(5).
[16] Phoenix Active Management Area Third Management Plan 12-2 (1999).
[17] Phoenix Active Management Area Fourth Management Plan 3-10 (2020).
[18] "A turf-related facility is any facility, including schools, parks, cemeteries, golf courses, or common areas within a housing subdivision, with ten or more acres of water-intensive landscaped area." Phoenix Active Management Area Fourth Management Plan 6-2 (2020).
[19] *Id*. at 11-3.

term storage credits. All values are shown to illustrate the extent to which allowable groundwater rights are exercised in each AMA. The table also includes the offsets to those demands that can be attributed to a given sector. Groundwater withdrawals, in combination with the use of other water supplies, may contribute to incidental recharge. CAGRD replenishment is also accounted for under the municipal sector. Overall, certain incidental and artificial recharge offsets are provided by sector in order to demonstrate the final average unreplenished groundwater demand by sector and AMA.

IMPACTS OF UNREPLENISHED GROUNDWATER WITHDRAWALS

One of the most difficult challenges for the State is that for the past 40 years, each water use sector has become accustomed to utilizing various types of allowable groundwater withdrawals. Water users have made investments and economic decisions based upon these groundwater rights and their associated costs under the current framework. At the same time, rigorous groundwater management goals have been established in the AMAs. The State has recognized that unreplenished or "residual" groundwater withdrawals create a hurdle for AMAs to reach their respective management goals. In regard to the Phoenix AMA, ADWR acknowledged in its Third Management Plan that the authorization of continued groundwater use under the Code "was not made with a full understanding of its relationship to the attainment of safe-yield."[20]

Based on the perpetual nature and volume of these rights and exemptions alone, the State will need to explicitly quantify these exemptions and determine whether additional conservation requirements, reductions in groundwater withdrawals, or other mitigating actions should be established to provide a counterbalance to the amount of allowable groundwater withdrawals. Natural, incidental, and artificial recharge in each AMA has been and will most likely continue to be less than the volume of allowable groundwater withdrawals.[21] Until they are addressed, the continued and further development of these groundwater rights and withdrawal exemptions will exacerbate water management challenges, including overdraft and physical availability of groundwater, no matter what the management goals may be beyond 2025.[22]

[20] Phoenix Active Management Area Third Management Plan 12-5 (1999).
[21] *See* ADWR Phoenix Active Management Area Fourth Management Plan (2020); ADWR Phoenix Active Management Area Third Management Plan 12-6. (1999); ADWR AMA Annual Supply and Demand Dashboard. Online Dataset. Accessed April 1, 2020. https://new.azwater.gov/ama/ama-data.
[22] DRAFT Pinal Active Management Area Fourth Management Plan 11-4 (2020).

***Table 1**: 2012-2016 Average Unreplenished Groundwater Demand by AMA and Sector (AF/year)*

	Active Management Area				
Sector and Type	**Prescott**	**Phoenix**	**Pinal**	**Tucson**	**Santa Cruz**
GROUNDWATER DEMAND 5-Year Average (2012-2016)					
Agricultural Sector	**1,939**	**623,307**	**611,059**	**101,784**	**10,134**
Groundwater	1,939	350,586	422,694	76,666	10,134
GSF Accounting	-	179,935	124,841	24,909	-
Tribal	-	92,786	63,524	209	-
Municipal Sector	**12,970**	**226,061**	**30,996**	**36,345**	**6,448**
Large Designated Providers	4,584	54,040	9,671	12,290	3,121
Large Undesignated Providers	5,098	89,468	16,290	16,560	2,845
Small Providers	1,062	3,688	1,521	4,046	313
Large Untreated Providers/Urban Irrigation	-	68,690	21	-	-
Domestic Exempt Well Demand	2,227	10,175	3,494	3,450	170
Industrial Sector	**1,592**	**107,024**	**18,273**	**57,107**	**1,161**
Sand & Gravel	316	11,311	570	3,855	150
Mining	-	30	-	35,995	-
Turf	976	58,972	4,016	10,773	886
Electric Power	-	11,617	-	1,591	-
Dairy	-	11,216	9,414	131	-
Cattle Feedlots	-	85	1,755	-	-
Other	300	13,793	2,518	4,762	125
TOTAL All Sectors	**16,501**	**956,392**	**660,329**	**195,236**	**17,743**
OFFSETS TO GROUNDWATER DEMAND					
Agricultural Sector					
Incidental Recharge	1,419	467,183	250,668	22,036	2,375
Municipal Sector					
Replenishment (CAGRD)	-	35,942	394	2,796	-
Incidental Recharge	-	67,968	1,461	6,401	-
Industrial Sector					
Incidental Recharge	238	9,149	786	5,322	148
TOTAL All Sectors	**1,657**	**580,241**	**253,308**	**36,555**	**2,524**
UNREPLENISHED GROUNDWATER DEMAND*					
Agricultural Sector	520	156,125	360,391	79,748	7,758
Municipal Sector	12,970	122,151	29,142	27,148	6,448
Industrial Sector	1,354	97,875	17,487	51,785	1,013
TOTAL All Sectors	**14,844**	**376,150**	**407,021**	**158,681**	**15,219**

*Average Unreplenished Demands are not the same as average Overdraft because they do not include natural recharge components.

ISSUE BRIEF #4

GROUNDWATER IN THE ASSURED WATER SUPPLY PROGRAM

ISSUE STATEMENT

Large parts of the Active Management Areas (AMAs) remain groundwater-dependent due to a lack of renewable water supplies and infrastructure, which creates uncertainties as groundwater supplies become more limited.

- What are the role and consequences of the use of groundwater to support new growth after 2025?
- What are the risks to homeowners whose physical groundwater supplies may be depleted after the regulatory Assured Water Supply 100-year timeframe?
- What roadblocks prevent access to renewable supplies and infrastructure in these groundwater-dependent areas?

BACKGROUND

The Assured and Adequate Water Supply Program was designed as a consumer protection law and has evolved into a significant tool for sustaining the state's economic health by preserving groundwater resources and promoting long-term water supply planning.[1] The Assured Water Supply (AWS) Rules for the State's AMAs were developed with stakeholder input over many years, ultimately adopted by the Arizona Department of Water Resources (ADWR) in 1995[2], and subsequently modified over time. The AWS Program provides consumer and economic protection by requiring a demonstration of a 100-year water supply to serve a new development before lots can be sold in the AMAs.

An AWS can be demonstrated through either a Designation of AWS (Designation) or Certificate of AWS (Certificate). To secure either a Certificate or Designation, a 100-year supply of water must be demonstrated to satisfy the needs of the proposed use, either for an applicant subdivision in the case of a Certificate, or for all of the demands within the service area of a water provider who seeks a Designation. The Director of ADWR must review a Designation at least every 15 years to determine whether the Designation should be modified or revoked.[3] The Director does not typically reevaluate a Certificate. Landowners also have the ability to apply for an Analysis of AWS to partially satisfy the regulatory criteria, prior to obtaining a Certificate. Analyses are typically used to prove that water will be physically available for master planned communities.[4] If an Analysis is issued for groundwater, it reserves a specific volume of water for 10 years (for purposes of other AWS reviews) only for the specific development plan or plat that is the subject of the Analysis.[5]

---

[1] https://new.azwater.gov/aaws.
[2] The 1995 rules did not include provisions specific to consistency with the management goal of the Santa Cruz Active Management Area (SCAMA), which was created by the Legislature in 1994 (A.R.S. § 45-411.04). AWS rules have not yet been modified to address consistency with the management goal of the SCAMA, and it is not addressed in this Issue Brief.
[3] A.A.C. R12-15-711.
[4] See *Application for an Analysis of Assured Water Supply*, https://new.azwater.gov/sites/default/files/media/AnalysisofAssured_REV%202-20-2020.pdf.
[5] A.A.C. R12-15-703. Analyses may be renewed in 5-year increments if certain criteria are met. *Id.*

An AWS for either a Certificate or Designation can be demonstrated based entirely or partially on groundwater. Two of the requirements for demonstrating an AWS are that the water for the proposed Certificate or Designation is physically available for 100 years and that the use of the water is consistent with the management goal of the AMA. Physical availability of groundwater is the regulatory measure of an applicant's ability to demonstrate sufficient groundwater for 100 years. To satisfy the physical availability requirement for groundwater, an applicant must show that its groundwater withdrawals would not cause the depth to groundwater to exceed a regulatory limit (1,000 feet below the land surface in the Phoenix, Tucson, Prescott, and Santa Cruz AMAs; 1,100 feet in the Pinal AMA) and would not negatively affect previously issued AWS Determinations[6] and existing municipal uses.[7]

The requirement that projected groundwater use be consistent with the management goal may be met if withdrawals are made pursuant to the groundwater allowance or through the use of pledged extinguishment credits (which are added to the groundwater allowance balance).[8] More detail on these types of groundwater withdrawals is provided in the *Unreplenished Groundwater Withdrawals Issue Brief*.

In the Phoenix, Pinal and Tucson AMAs, the requirement that projected groundwater use be consistent with the management goal may also be satisfied if the subdivision or water provider becomes a member of the Central Arizona Groundwater Replenishment District (CAGRD). The Arizona Legislature authorized the CAGRD as a responsibility of the Central Arizona Water Conservation District (CAWCD), which operates the Central Arizona Project (CAP). Since CAWCD encompasses only Maricopa, Pinal and Pima Counties, the CAGRD does not serve the Prescott or Santa Cruz AMAs. The CAGRD replenishes *excess* groundwater[9] pumped by or delivered to its members, after that volume is annually calculated and reported to the CAGRD. The CAGRD must submit a Plan of Operation every ten years to ADWR for review and approval. The Director of ADWR must determine whether the Plan is consistent with achieving the management goals of the AMAs in CAGRD's service area.[10]

ISSUE DESCRIPTION

Even with the benefits that followed the 1980 Groundwater Management Act, there are numerous pressures placed on groundwater in the AMAs, many of which have been identified in the *Unreplenished Groundwater Withdrawals, Hydrologic Disconnect,* and *Exempt Wells* Issue Briefs. The AWS Program has been a significant factor in encouraging municipal water providers to reduce groundwater use in the AMAs over the last 25 years. In the context of all the challenges identified by the Post-2025 AMAs Committee, the State should evaluate the AWS Program and consider how it can be improved well beyond 2025. Three main questions related to groundwater use under the AWS Program provide a starting point for evaluating whether the AWS Program could better provide consumer and economic protection and better aid in achieving the AMA management goals.

---

[6] A.A.C. R12-15-701(31): "Determination of assured water supply" means a certificate, a designation of assured water supply, or an analysis of assured water supply.

[7] A.A.C. R12-15-716 and ADWR Substantive Policy Statement: *Hydrologic Studies Demonstrating Physical Availability of Groundwater for Assured and Adequate Water Supply Applications* (AWS 7).

[8] A.A.C. R12-15-722. The Groundwater Allowance is a volume of groundwater which may be calculated for each AWS Certificate or Designation according to rules specific to each AMA. *See Unreplenished Groundwater Withdrawals Issue Brief.*

[9] "Excess groundwater" is any amount of pumped groundwater beyond what is permitted by the AWS rules. With a few exceptions, this generally means the volume of groundwater pumped that exceeds the groundwater allowance and/or extinguishment credits of a CAWS or DAWS. More detail on CAGRD operations is provided in the *CAGRD Replenishment and Water Supplies Issue Brief*.

[10] A.R.S. § 45-576.03.

What are the role and consequences of the use of groundwater to support new growth after 2025?

Under the current regulatory structure, groundwater will continue to be utilized to serve subdivisions that fall under the jurisdiction of the AWS Program. New Certificates or Designations of AWS may utilize groundwater that is consistent with the management goal through the use of Extinguishment Credits, the Groundwater Allowance, or membership in the CAGRD. As groundwater uses expand to serve new development, there is a corresponding reduction to the volume of groundwater that exists in the aquifer, some of which is replenished. In the Phoenix, Pinal, and Tucson AMAs, localized groundwater depletion can be mitigated when replenishment occurs in close proximity to withdrawals.[11]

Groundwater withdrawals by all sectors will impact the ability of new AWS applicants to demonstrate physical availability of groundwater. In the Pinal AMA, ADWR modeling shows insufficient groundwater is physically available to meet the demands of previously issued Analyses, Certificates and Designations over the 100-year modeling period. If left unresolved, additional AWS applications using groundwater or stored water recovered outside the area of impact will not be approved.[12] The Prescott AMA faces similar challenges, with an increasingly reduced volume of groundwater physically available for new AWS Determinations.[13] Other AMAs are also likely to face reduced physical availability of groundwater after 2025.

In addition to curtailing the ability to subdivide lands for new development, continued groundwater reliance may lead to other adverse impacts. Unless steps are taken to reduce or ameliorate impacts of groundwater drawdown, depths to water in the AMAs would decline, resulting in increased land subsidence, decreased aquifer storage, and the potential deterioration of water quality.[14] The degree to which these adverse impacts may occur when groundwater levels fall to depths of 1,000' below land surface is also unknown.[15] ADWR is in the process of updating its groundwater models for the Phoenix and Tucson AMAs, which should provide better projections of the groundwater supplies in these two AMAs.

What are the risks to homeowners whose physical groundwater supplies may be depleted after the regulatory Assured Water Supply 100-year time frame?

While the water demands of all previously issued Certificates or Designations must be incorporated in future AWS applications, groundwater pumping reduces the amount of groundwater available for all existing municipal water providers serving certificated lands or designated service areas through time. These impacts may be more likely to occur where pumping and replenishment or storage and recovery are hydrologically disconnected. Even with an AWS Determination, other factors, including withdrawals

[11] The CAGRD has the flexibility to replenish in various locations to fulfill its replenishment responsibilities but is not required to replenish within the area of impact of its members' groundwater pumping. The CAGRD is not responsible for ensuring groundwater physical availability for its members, but rather to maintain its members' consistency with the AMA management goal.

[12] 2019 Pinal Model and 100-year Assured Water Supply Projection Technical Memorandum, October 11, 2019, http://infoshare.azwater.gov/docushare/dsweb/Get/Document-11793/2019_Pinal_Model_and_100-Year_AWS_Projection-Technical_Memorandum.pdf; Pinal Model 2019 Update Presentation, November 1, 2019, Slide 53, https://new.azwater.gov/sites/default/files/20191101_Pinal_Model_2019_Presentation.pdf.

[13] Prescott AMA 4MP, Section 1.5, page 1-4.

[14] "Ground-Water Depletion Across the Nation." USGS, 2003. https://pubs.usgs.gov/fs/fs-103-03/JBartolinoFS(2.13.04).pdf.

[15] Phoenix 3MP – Section 8.9; Previous scholarship has demonstrated that the 1,000 foot depth limit was not based upon hydrological or technical considerations (see, Rita Pearson Maguire, *Patching the Holes in the Bucket: Safe Yield and the Future of Water Management in Arizona,* 49 Ariz. L. Rev. 361 (2007)).

from groundwater users not subject to the AWS requirements, may also affect the availability of groundwater supplies during the 100-year regulatory timeframe of an AWS Certificate or Designation. Ultimately, homeowners rely on the water provider for service, with an expectation of consumer protection by local or state government, no matter the status of the AWS.

What roadblocks prevent access to renewable supplies and infrastructure in these groundwater-dependent areas?

Groundwater-dependent municipal water providers face obstacles in their ability to acquire renewable water supplies, to become Designated, to extend their existing Designations, or to reduce or eliminate their reliance on the groundwater. There are 276 undesignated municipal water providers in the five AMAs. Since 2000, no undesignated municipal water providers have successfully been newly Designated in the Phoenix AMA, which illustrates the difficulty of building a renewable water supply portfolio and reducing dependence on groundwater.

One of the primary challenges to reducing groundwater reliance is the lack of available renewable supplies. With fewer renewable supplies available for acquisition, competition for those supplies will increase in the future. The 2019 *Long-Term Water Augmentation Options for Arizona* report concluded that, for the most part, Arizona's water augmentation options have already been identified and additional water supplies coming from outside of Arizona are not expected except for the potential opportunity of a desalination project with Mexico.[16] The report also emphasized the importance of working with the water resources we have to meet our future needs.[17]

Additional obstacles faced by groundwater-dependent municipal water providers include the lack of institutional structures to facilitate the acquisition of renewable supplies, constraints on the marketability of surface water rights, costs of such supplies, certain restrictions imposed on private utilities by the Arizona Corporation Commission, resistance to and/or limitations on water transfers, obstacles to accessing infrastructure to move renewable supplies, and the need to acquire permanent renewable water supplies well in advance of actual water use as emphasized by the AWS Rules. These obstacles compound an overarching challenge for water providers to finance renewable water supplies, particularly those with smaller customer bases or greater geographical distance from augmentation opportunities. These challenges are even more acute in the Pinal, Prescott and Santa Cruz AMAs.

The recent effort by the Town of Queen Creek to acquire renewable supplies to obtain a Designation and eliminate the replenishment obligation of the CAGRD member lands it serves, demonstrates the difficult financial and logistical hurdles municipal water providers face. Understanding the Town's challenges and motivations, as well as those of the City of Buckeye, which has also pursued for years a Designation, could deepen the understanding of these issues and present opportunities for improvement moving forward.

[16] *Long-Term Water Augmentation Options for Arizona*, Prepared for the Long-Term Water Augmentation Committee of the GWAICC by Carollo Engineers, Montgomery & Associates and WestLand Resources, Inc., p. 2, https://new.azwater.gov/sites/default/files/Long-Term%20Water%20Augmentation%20Options%20final.pdf.
[17] *Ibid.*

ISSUE BRIEF #5

CAGRD REPLENISHMENT AND WATER SUPPLIES

ISSUE STATEMENT

The Central Arizona Groundwater Replenishment District (CAGRD) provides a mechanism to replenish some of the Assured Water Supply related groundwater use within three Active Management Areas. However, the CAGRD and its members face long-term uncertainties related to the availability and costs of supplies for replenishment.

- What are the long-term uncertainties for the CAGRD related to the availability of renewable supplies for replenishment?
- What issues may arise as replenishment supply costs are borne by the CAGRD and passed on to its members?
- What concerns exist about ADWR's oversight and review criteria of CAGRD Plans of Operation in relationship to the CAGRD's long-term viability?

BACKGROUND

In 1993, the Arizona State Legislature established the framework for a groundwater replenishment authority known as the Central Arizona Groundwater Replenishment District (CAGRD), to be operated by the Central Arizona Water Conservation District (CAWCD). The CAGRD provides a mechanism for landowners and municipal water providers in the Phoenix, Pinal and Tucson Active Management Areas (AMAs) to demonstrate one of the assured supply criteria for groundwater under the Assured Water Supply (AWS) Rules, which were adopted in 1995. Without the CAGRD, some developers and water providers would not be able to meet the AWS Program criterion of consistency with the management goal of the AMA.[1] CAGRD membership demonstrates consistency with the management goal as required in the AWS Rules by allowing new subdivisions and municipal water providers lacking sufficient renewable supplies or infrastructure to develop using groundwater. The CAGRD mechanism in particular has facilitated continued economic development in areas of the three AMAs without CAP allocations or with insufficient infrastructure to put their CAP allocation to use. The CAGRD replenishes the *excess* groundwater[2] pumped by or delivered to its members. In other words, CAGRD membership allows municipal water providers or landowners to withdraw and use groundwater upfront, while the CAGRD replenishes the aquifer to offset the volume of excess groundwater withdrawn in an AMA by its members after the fact.

The CAGRD serves two types of members: member lands (MLs), which are individual subdivisions, and member service areas (MSAs), which are municipal water providers such as cities, towns, districts, or water companies that enroll their water service area. A municipal provider may enroll as an MSA in order to obtain a Designation of AWS if its portfolio of water supplies includes groundwater requiring replenishment. There are currently 24 active MSAs enrolled in the CAGRD.[3] When applying for a Certificate of AWS, the developer of a subdivision may enroll the subdivision as an ML in the CAGRD while also demonstrating physical, legal and continuous access to a volume of groundwater equal to 100 years of

[1] A.A.C. R12-15-722
[2] "Excess groundwater" is any amount of pumped groundwater beyond what is permitted by the AWS rules.
[3] https://cagrd.com/documents/enrollment/MSA-Enrollment-History-Member-Service-Area-List.pdf

the projected use by the subdivision.[4] As of November 5, 2020, 1,194 subdivisions have been enrolled as MLs in the CAGRD, encompassing over 290,000 lots.[5] A large number of ML subdivisions, particularly in the Pinal AMA, are enrolled in the CAGRD but have not yet been developed. The CAGRD 2015 Plan of Operation cites approximately 140,000 enrolled but unbuilt lots across the three AMAs served by the CAGRD.[6] Although the replenishment obligation of the CAGRD is based on the reported excess groundwater use of subdivisions that have been built, the CAGRD must plan for the projected build-out obligations of all its enrolled members.

The CAGRD is obligated to replenish excess groundwater pumped by its members within three years after the obligation is incurred.[7] As excess groundwater pumping by CAGRD members increases[8], the CAGRD must acquire water supplies to meet those replenishment obligations and for its replenishment reserve.[9]

At least every ten years, the CAGRD is required by statute to submit a Plan of Operation (Plan) that conforms with the management goals of each AMA in its service area to the Director of the Arizona Department of Water Resources (ADWR) for approval.[10] The Plan must satisfy a list of statutory planning requirements, showing the CAGRD's ability to meet projected replenishment obligations for its current and estimated near-term membership. In the Plan, the CAGRD is required to show the supplies it plans to use to meet replenishment obligations for 20 years as well as identify potentially available supplies for the subsequent 80 years.[11] The CAGRD does not need to demonstrate that its supplies are available for 100 years because the CAGRD is not a water provider and the 100-year AWS criteria do not apply to the CAGRD. This allows the CAGRD to utilize supplies of less than 100 years in duration. This differs from the AWS requirements for obtaining and maintaining a Certificate or Designation of AWS in which physically available supplies must be identified and available during the full 100-year period. Since the CAGRD can make use of shorter-term water supplies, its water supply acquisition plans are often described as not competing with other entities, including its own members who seek to acquire long-term supplies for AWS Designations.

Since the CAGRD's inception, long-term uncertainty in available supplies has been an issue in part because the CAGRD is required to initially identify in each Plan only the water supplies available to the CAGRD for replenishment for twenty years and because of the CAGRD's early reliance on Excess CAP water[12] to meet its replenishment obligations. Numerous statutory changes as well as policy and rate adjustments by CAWCD have been implemented over time to mitigate this uncertainty. In 2003 and 2005, statutory changes were made to strengthen the ADWR Director's oversight and approval of the CAGRD Plans of Operation. Changes included requiring the CAGRD to identify water resources potentially available for the

[4] The role of CAGRD and groundwater in the AWS Program is discussed in the *Groundwater in the Assured Water Supply Program Issue Brief*.

[5] https://cagrd.com/documents/enrollment/CAGRD-Member-Land-Enrollment-Summary.pdf

[6] 2015 Central Arizona Groundwater Replenishment District Plan of Operation, p. 3-6.

[7] A.R.S. §48-3771(A).

[8] Increases in excess groundwater pumping are projected due to several factors, including the buildout of existing CAGRD member demands, the demands of new/future members, the depletion of alternative groundwater supplies such as groundwater allowances, and the restriction on groundwater allowances for Certificates or Designations issued after 2025.

[9] A.R.S. §48-3771.A and A.R.S. §48-3771.C – "Except as provided by title 45, chapter 3.1, the district may replenish groundwater with central Arizona project water or water from any other lawfully available source except groundwater withdrawn from within an active management area."

[10] A.R.S. §45-576.03

[11] A.R.S. §45-576.02(C)(2)

[12] Excess CAP water is defined as "all Project Water that is in excess of the amounts used, resold, or exchanged pursuant to long-term contracts and subcontracts for Project Water service." CAP Repayment Stipulation, ¶5(d)(1).

subsequent 80 years after the first 20 years of identified water resources and requiring the development and approval of a revised Plan if the Director determines that there is either an unexpected increase in projected replenishment obligations or an unexpected reduction in water supplies available to meet the CAGRD's obligations.[13]

The CAGRD continues to acquire supplies and build a portfolio that CAGRD projects will be sufficient to meet its annual replenishment obligations until 2050.[14] In its early years, the CAGRD met its replenishment obligations primarily through the use of Excess CAP water as it was readily available and relatively inexpensive. In recent years, the availability of Excess CAP water has decreased substantially, and it will likely be reduced or entirely unavailable in the future.[15] The CAGRD has long planned for the reduced availability of Excess CAP water and for future Colorado River shortage impacts to its other supplies. This is evidenced by the establishment of its formal water acquisition program and its requirement to develop a replenishment reserve of long-term storage credits that can be utilized to meet its obligations and enhance rate stability in times of water supply shortage or infrastructure failure. Its acquisition program is guided by principles adopted by the CAWCD Board that seek a 50/50 mix of short-term and long-term supplies in anticipation of projected increases in replenishment obligations.

To date, these efforts have resulted in the CAGRD acquiring over 250,000 acre-feet of the 764,502 acre-feet targeted amount for the replenishment reserve in the CAGRD 2015 Plan of Operation. Under its acquisition program, the CAGRD has acquired a total annual supply of approximately 44,000 acre-feet per year compared to the recent average annual replenishment obligation of approximately 30,000 acre-feet per year.[16] In addition, the CAGRD has pending a CAP Non-Indian Agricultural (NIA) priority reallocation of 18,185 acre-feet per year and a lease from the White Mountain Apache Tribe for 2,500 acre-feet per year.[17]

The CAGRD has also made adjustments to its policies and rate structure to mitigate for the uncertainty of supply availability and cost. For example, between 2015 and 2019, activation fees (paid by homebuilders prior to issuance of a building permit for a residence) averaged a 33% increase per year for the Phoenix and Pinal AMAs, and a 27% increase per year in the Tucson AMA. Stakeholders, including homebuilder and developer representatives, agreed to this change during the development of the CAGRD 2015 Plan of Operation because it generates a more significant portion of funding for future water supplies prior to homes being built and replenishment obligations being incurred. This ensures the CAGRD has the funds necessary to purchase additional replenishment supplies for the new obligation and provides more equity among the CAGRD's members (i.e., future members pay more up front for the supplies required to meet their obligations without being subsidized by long-term members).

These incremental changes over the years have served to mitigate the impact of the uncertainties in the CAGRD's ability to secure renewable supplies to offset its growing replenishment obligations. However, with the expectation of increased competition for limited supplies, rising acquisition costs, increased growth using groundwater supplies requiring replenishment, and the growing risk of Colorado River

[13] Such a finding can only be made between the second and eighth year of the current Plan of Operation. A.R.S. § 45-576.03(R).
[14] CAWCD Board Information Brief, November 19, 2020, pg. 12, https://www.cap-az.com/documents/meetings/2020-11-19/1827-111920-WEB-Final-Packet-CAGRD.pdf
[15] CAGRD 2019 Mid-Plan Review, p. 17.
[16] CAGRD 2019 Mid-Plan Review, p. 18. The annual portfolio of 43,896 AF includes a mix of CAP M&I priority supplies (8,311 AF), an exchange of CAP Indian priority supplies (15,000 AF), effluent (2,400 AF), and a lease of CAP NIA priority supplies (18,185 AF) subject to shortage reduction.
[17] Upon their final approval, the availability of these NIA priority supplies will also be subject to shortage.

shortages, it remains important to continue to take steps to mitigate this uncertainty to ensure the viability of the CAGRD.

ISSUE DESCRIPTION

The CAGRD has a unique responsibility to secure water supplies to replenish excess groundwater used by its growing membership. The Post-2025 AMAs Committee has identified three main questions related to the long-term availability and costs of renewable supplies for the CAGRD and its members to provide a starting point for evaluating opportunities for improvement that would benefit future AMA water management.

What are the long-term uncertainties for the CAGRD related to the availability of renewable supplies for replenishment?

One unique aspect that the CAGRD faces as it seeks to acquire new supplies is that groundwater could theoretically be more plentiful than renewable supplies, such that new AWS determinations that rely on the CAGRD could continue to be issued based on physically available groundwater, while the CAGRD is tasked with developing an equivalent renewable supply for replenishment beyond when it is feasible to do so. In other words, if groundwater supplies continue to be available to meet the demands of new MLs and MSAs, there is the potential for a future shortfall in replenishment supplies for the CAGRD to meet its obligations and maintain consistency with the AMA management goals.

The CAGRD 2015 Plan of Operation identified substantial supplies as potentially available in the long-term, some of which would be more firm than CAP supplies.[18] Yet, the quantity and accessibility of renewable supplies realistically available in the future are as uncertain for the CAGRD as for other water users. Fewer available water supplies for acquisition will likely lead to increased competition among the CAGRD and other entities seeking additional supplies for future use, including large industrial users and municipal and private water utilities.[19] In some cases, these entities are also CAGRD members or serving CAGRD member lands. The difficulties of acquiring water supplies beyond 2025 are compounded by the current complexities and contention surrounding the transfer of Colorado River water from the river to Central Arizona. Opposition from On-river interests to these Colorado River mainstem transfers and the increasing cost of such water supplies may also have an impact on future CAGRD acquisition activities.[20]

As described above, the CAGRD appears to have sufficient supplies to meets its annual replenishment obligations until 2050.[21] However, if supplies become more limited or entirely unavailable for acquisition by the CAGRD after 2025, communities that rely on the CAGRD for new development and economic growth run the risk that they would not be able to comply with the AWS Program. As designed, if the CAGRD is not successful in acquiring sufficient supplies to support new and existing membership per statute, new development may be limited, and current Designations of AWS that rely on the CAGRD will likely be in jeopardy. Depending on the amount of the shortfall, it is possible that some excess

[18] CAGRD 2015 Plan of Operation, p. 4-14.
[19] *Long-Term Water Augmentation Options for Arizona*, Prepared for the Long-Term Water Augmentation Committee of the GWAICC by Carollo Engineers, Montgomery & Associates and WestLand Resources, Inc., https://new.azwater.gov/sites/default/files/Long-Term%20Water%20Augmentation%20Options%20final.pdf.
[20] CAGRD 2019 Mid-Plan Review, p. 2.
[21] CAWCD Board Information Brief, November 19, 2020, pg. 12, https://www.cap-az.com/documents/meetings/2020-11-19/1827-111920-WEB-Final-Packet-CAGRD.pdf.

groundwater use may not get replenished. This would have negative impacts on future development in areas without access to renewable supplies and on the State's economy as a whole.

What issues may arise as replenishment supply costs are borne by the CAGRD and passed on to its members?

Since the CAGRD has a perpetual obligation to replenish excess groundwater used by its members, it must continually acquire replenishment supplies to meet that obligation. The costs for such acquisitions are anticipated to increase as availability of renewable water supplies decreases. This will also be true for water providers or other entities looking to acquire renewable supplies.[22] Since the CAGRD is not a water provider, its revenue structure is also different from that of a municipal water provider. The CAGRD collects revenues through up-front fees paid by the landowner or developer, through annual membership dues, and through either an annual replenishment assessment (on ML property owners) or an annual replenishment tax (on MSAs) based on replenishment obligation volume. As such, long-term replenishment costs ultimately must be borne by the CAGRD member homeowners (MLs) or water providers (MSAs). MSA water providers usually roll the total costs of water service and replenishment into the rates their water users pay. For ML homeowners, the CAGRD replenishment costs are not directly connected to and are in addition to the monthly water service cost paid to the member's water provider.

For MLs, rising long-term replenishment costs might serve as an incentive to use less excess groundwater. However, after the development of a subdivision, the financial responsibility of CAGRD membership is borne by the ML homeowner and paid via property taxes to the county assessor's office. This structure was put in place to create administrative certainty for the CAGRD in collecting its revenue streams. But for the homeowner, this structure can create a disconnect between their water use and its full cost. With the true cost of a renewable water supply contained in a property tax bill, often paid through a mortgage, the benefits of conserving groundwater are not readily apparent. For accounting and reporting reasons, there is also a delay of nearly one year between the delivery of excess groundwater to a homeowner and the replenishment assessment appearing on their property tax bill. Further, by the CAGRD's replenishment costs being paid by the homeowner, the ML water provider may not have sufficient inducement to conserve water beyond the requirements contained in the management plans for each AMA. Smaller water providers may not have the resources available for water conservation and privately-owned water providers may need to limit conservation activities in order to obtain Arizona Corporation Commission approval on rates. These disconnects between water use and water cost through the CAGRD have the potential to add to the replenishment obligation of the CAGRD.

The CAGRD has the financial authority to meet its replenishment obligations, but further analysis may be warranted regarding the growing fiscal impact to its members over the long-term and how in turn that could stress the CAGRD's structure in the future. The CAGRD's up-front fees, membership dues and assessment rates increase annually to keep up with costs associated with expanded CAGRD requirements, including funding the replenishment reserve and the establishment of the water supply acquisition program, as well as its annual water supply costs. As an example, the CAGRD calculated that the 2018 acquisition of water and credits from the Gila River Indian Community and Gila River Water Storage LLC for a 25-year period would increase the CAGRD Phoenix AMA members' combined rates by 11-15 percent

[22] Challenges to entities acquiring renewable water supplies are discussed in the *Groundwater in the Assured Water Supply Program Issue Brief*.

over the next two to three years.[23] Although the actual rate increase in the Phoenix AMA has been lower than expected since that time, this demonstrates the CAWCD Board will most likely need to consider additional acquisitions with sizable impacts to CAGRD rates.

As replenishment rates increase, some members and large water users are starting to seek ways to reduce CAGRD costs. Since the CAGRD's current rates are bundled and assessed on the volume of reported excess groundwater, some members with larger water demands have pursued temporary avoidance of CAGRD replenishment obligation by acquiring short-term supplies like long-term storage credits (LTSCs) or extinguishment credits (ECs) to offset the amount of excess groundwater they report to CAGRD. This more recent practice can impact CAGRD members because the fixed costs of CAGRD replenishment are redistributed over fewer members. If this practice grows in the future, the CAGRD has concluded it could weaken its ability to financially sustain itself.[24] Overall, increasing water costs are not unique to the CAGRD but the impacts of how those costs are assessed on its members, often as a second charge for water use, and the implications for the CAGRD financial structure in the future are unclear.

What concerns exist about ADWR's oversight and review criteria of CAGRD Plans of Operation in relationship to the CAGRD's long-term viability?

Under existing laws, the Director of ADWR must determine whether the CAGRD Plan of Operation is consistent with achieving the management goal of each AMA in the CAGRD's service area.[25] This requirement provides oversight on whether the CAGRD has the water supplies and financial ability to meet its replenishment obligations. With an approved Plan, enrollment in the CAGRD may continue. As described above, the Plan estimates the water supplies required to meet the replenishment obligations of both current and near-term enrollments. If ADWR were to determine that the Plan is not consistent with the management goal, a moratorium would be imposed on the enrollment of new members lands and cause the expiration of Designations of AWS based on CAGRD membership, pursuant to A.R.S. § 45-576.06(A). Such a determination is viewed as a "worst case" outcome, however, and would certainly be detrimental to the state's economy. As has occurred over the past 20 years when the CAGRD's statutory duties were revised and expanded, revisiting ADWR's oversight of the CAGRD, including the criteria used by ADWR to review the Plan, could provide suggestions to improve the long-term sustainability of the CAGRD for the benefit of its current and future members.

[23] Central Arizona Water Conservation District Board of Directors Action Brief, *Discussion and Consideration of Action to Approve a Water Supply Acquisition and Association Agreements between CAGRD, Gila River Indian Community (GRIC) and Gila River Water Storage (GRWS),* November 1, 2018.
[24] CAWCD Board of Directors Information Brief, Report on and Discussion of Elliott D. Pollack & Co. Impact Report on Third-Party LTSC Sales to CAGRD Member Lands, Feb 16, 2017.
[25] A.R.S. §45-576.03.

ISSUE BRIEF #6

AMA MANAGEMENT STRUCTURE

ISSUE STATEMENT

There is no statutory provision establishing Active Management Area (AMA) goals or additional management periods and plans after 2025. The fifth management plans will remain in effect until statutory changes designate otherwise.

ISSUE DESCRIPTION

The 1980 Groundwater Management Act established Active Management Areas (AMAs), which are geographic areas where groundwater overdraft was the most severe or where significant groundwater overdraft was likely to occur in the near future (Prescott AMA). Under the Act, management goals are established for each AMA, and a series of management plans must be developed for each AMA that include mandatory conservation programs designed to reduce withdrawals of groundwater.[1]

The Director of ADWR is required by statute to develop a management plan for each AMA for each of five management periods, spanning the years 1980 through 2025. The management plans are designed to assist each AMA in achieving its management goal. The management plans contain conservation programs for agricultural, municipal, and industrial groundwater users as well as the Water Management Assistance Program and information about enforcement provisions. Management periods also tie into the Assured Water Supply Program, with factors related to groundwater allowances and extinguishment credits decreasing over successive management periods.

The fifth and final management period is from 2020 to 2025. The management plans that will be developed for this period remain effective thereafter "until the legislature determines otherwise."[2] There are no statutory provisions for management periods beyond 2025 nor for additional management plans. Additionally, the Phoenix, Prescott, and Tucson AMAs' safe-yield management goal is tied to achievement by 2025, while the statutes are silent on the management goals in those AMAs after that time. This leaves the State with limited ability to adapt, build upon, and revise groundwater management plans and strategies in the AMAs as needed due to projected population growth, ongoing drought, a drier, warmer climate, and anticipated Colorado River shortages, among other factors.

The Post-2025 AMAs Committee has identified several complex issues that present an opportunity to strengthen and improve water management in the AMAs well beyond 2025. These issues relate to unreplenished groundwater withdrawals, exempt wells, the hydrologic disconnect between recharge and recovery, the CAGRD, and the Assured Water Supply Program. The management plans have been a foundation for developing tools and strategies that would improve water management and conservation strategies. In order to provide certainty and more effectively plan and manage water supplies in the AMAs in the future, it is critical to clarify whether the AMA management goals, the 10-year management period cycle, and the management plans themselves are appropriate and should be carried forward after 2025.

[1] A.R.S. § 45-563(A).
[2] A.R.S. § 45-568(C).