12.1 INTRODUCTION

The 4MP programs were developed within current statutory guidelines. However, as described in Chapters 8 and 10, full implementation and complete compliance with the conservation requirements outlined in Chapters 4, 5, and 6 are not likely to result in the achievement of the AMA goal by the year 2025. The communities of the PRAMA are facing water management challenges due to the lack of sufficient and redundant renewable supplies. They lack access to CAP supplies and surface water supplies within the AMA are hydrologically or legally limited.

12.2 WATER MANAGEMENT ISSUES

Although current statutes and rules require new growth in the PRAMA to be consistent with the goal of safe-yield, many existing uses are not subject to this requirement. In addition, land subdivided prior to the adoption of the Groundwater Code is not required to be developed in a manner consistent with the AMA goal. This means that, under current regulations, groundwater overdraft in the PRAMA may continue and can increase above current rates. Although some have recommended that ADWR impose greater restrictions on groundwater pumping in the PRAMA, ADWR does not have statutory authority to do so. Imposing additional conservation measures, enforcing groundwater pumping restrictions, and increasing and carefully managing underground water storage and recovery could be accomplished without additional ADWR authority if local authorities and individual water users opted for local ordinances and self-regulation.

As previously stated, non-groundwater water supplies in the PRAMA are limited. With full allocation of AMA groundwater supplies, new growth becomes dependent on acquiring and utilizing renewable or augmented supplies. The AMA surface water supply is inconsistently available, depending on weather and climatic conditions, and is subject to prior agreements based on surface water claims and the pending General Stream Adjudication. The reclaimed water supply is derived from water delivered for municipal uses that makes its way into centralized wastewater systems and infrastructure. Thus, its availability is a function of the availability of other water supplies, interior water demand, and the proportion of the population on sewer systems. The feasibility of imported water supplies continues to be examined but, to date, these supplies are not available to AMA water users.

The Safe-Yield Subcommittee of the PRAMA GUAC identified numerous impediments to achieving safe-yield in its 2006 “Final Report on Safe-yield Impediments, Opportunities, and Strategic Directive.” These included the issues described below, as well as other issues. This study also identified next steps and potential solutions. In April 2013, the “Central Yavapai Highlands Water Resources Management Study Phase III – Water Supply Alternatives” (US Bureau of Reclamation, 2013) identified several options to augment water supplies in the PRAMA and other areas in the Central Yavapai Highlands. Many of the ideas for next steps and solutions described in CYHWRMS are included in this chapter.

The following section describes in detail the major water management issues facing the PRAMA during the fourth management period and beyond.

12.2.1 Allowable Pumping

Under existing law, several categories of water users, both existing and potential new users, may withdraw groundwater without replenishing, or replacing, that volume of water back into the aquifer. These uses contribute to overdraft, and under current regulations may increase and continue in perpetuity.

Agricultural Sector
Irrigation Grandfathered Groundwater Rights (IGFRs) allowing farmers to withdraw groundwater for agricultural purposes were granted at the time the Code was adopted. No new IGFRs may be created, but the existing rights may be conveyed to new owners, converted to Type 1 Non-Irrigation Grandfathered Rights (Type 1 GFRs), or extinguished for AWS consistency with goal credits. The trend through 2010 in the PRAMA shows that many IGFRs have been inactivated. Many of the inactivated IGFRs have been extinguished. IGFRs that remain represent a perpetual authority to withdraw groundwater without a replenishment requirement, though this volume is relatively small in comparison to domestic water uses.

Industrial Sector
The future use of Type 1 and Type 2 GFRs depends on the potential for growth in non-irrigation groundwater use. Historically, Industrial demand in PRAMA has been fairly stable and largely associated with golf course use. However, there is a large volume of Industrial allotment that could be used and represents additional authority to pump groundwater. As with IGFRs, there is no requirement for GFRs to replenish their groundwater use.

Additionally, the Code gives the director the authority to issue several types of groundwater withdrawal permits. Many of these are short term uses, for exploratory or de-watering purpose. A longer term permit is a General Industrial Use (GIU) permit, which the Code allows to be issued for up to 50 years and may be renewed. There is no requirement for any of the users of water pursuant to these permits to replenish their groundwater use.

There are many factors that impede the ability of industrial users to use renewable water supplies, including lack of proximity to renewable supplies, reliability of supply, cost, supply ownership, infrastructure, and water quality issues. Although there are no significant water quality problems associated with using reclaimed water on turf-related facilities in the PRAMA, use of this source by other Industrial users could require additional treatment to remove salts, organics, and other constituents.

Municipal Sector
The Municipal sector is the dominant water use sector in the PRAMA. Municipal demand more than tripled between 1985 and 2010, increasing to approximately 18,000 acre-feet by 2010. The degree to which municipal groundwater use must be replenished has evolved over time, as described below:

- Prior to the adoption of the statewide Water Adequacy Program in 1973, no determination or evaluation of the water supply for future development was required whatsoever, and there was no requirement for new development to replenish the groundwater it would use.

- From 1973 until 1980, the Adequacy Program was in effect statewide, requiring developers to disclose the adequacy of the water supply to new home buyers. However, a determination that the water supply was inadequate did not prevent the development from moving forward. The Adequacy Program does not require groundwater to be replenished.

- In 1980, the Groundwater Code established the AMAs and required an Assured Water Supply (AWS) within those AMAs. To prove an AWS, a developer must demonstrate five criteria:

- the water supply for the new development is physically, legally and continuously available;
- the developer has the financial capability to construct any infrastructure necessary to provide water to the new development;
- the proposed water supply meets water quality standards;
- the water supply is consistent with the management plan of the AMA; and
- the water supply is consistent with the management goal of the AMA.

To prove consistency with the safe-yield water management goal, groundwater use must be limited and replenished, or renewable supplies must be used in place of groundwater.

- In 1995 AWS Rules were adopted which further defined and explained how an AWS is proven. At that time, the PRAMA was considered to be at a state of safe-yield and the consistency with goal requirement was not required for AWS applicants in the PRAMA.

- In 1999, the director declared that the PRAMA was no longer in safe yield. Since then, new developments applying for an AWS have been required to meet all of the AWS criteria including consistency with the AMA goal. To do this, nearly all new development in PRAMA has been using extinguishment credits, which are generated from the permanent extinguishment of grandfathered groundwater rights, and then pledged to the new subdivision.

Under the AWS Rules, ADWR must consider the demand associated with previously issued determinations of AWS and Adequacy as "committed demand" when determining whether there is additional physical availability of groundwater in the AMA's aquifers for new applications for AWS. In PRAMA there are currently many lots making up committed demand that are not required to meet consistency with the AMA goal. Of the estimated 4,000 – 5,000 acre-feet of potential demand associated with platted but not yet built lots in the PRAMA, only 550 acre-feet is associated with post-declaration subdivisions which have been required to meet the consistency with goal criterion. This means that much of the current growth potential in the PRAMA can result in additional groundwater overdraft with no further review of groundwater availability by ADWR and no requirement for replenishment, making it more challenging for the PRAMA to achieve safe-yield. For a more detailed discussion of committed demand, see Appendix 12-1.

Exempt Wells

As of 2010, the PRAMA population self-supplied by exempt domestic wells was greater than the population served by Small Municipal Providers. Although Small Providers are required to report their water use annually to ADWR and have limitations on water wasting and on lost and unaccounted for water. Exempt well owners are exempt from all regulatory programs. ADWR lacks the authority to impose any conservation requirements on exempt well water use, nor can ADWR require exempt well owners to meter and report water use data. For purposes of the Assessment and the 4MP, ADWR estimated that each person self-supplied via an exempt well would use 90 gallons per capita per day. This estimate is based on the 3MP single-family interior and exterior water use models for new development. ADWR has little data on exempt well uses, but preliminary examinations have revealed that there is wide variation in the annual water use among exempt well owners.

Groundwater Allowance

Post- Declaration, the consistency with goal provision of the AWS Rules has been in effect in the PRAMA. However, pursuant to the AWS Rules, a certain volume of groundwater is allowed to be used

and not replenished or offset. These groundwater allowances are designed to help municipal providers transition from groundwater to renewable supplies and to allow legal pumping of groundwater during periods when renewable supplies are not available.
When a Designation of Assured Water Supply (DAWS) or Certificate of Assured Water Supply (CAWS) is issued, a groundwater allowance account is established. ADWR may credit additional allowable groundwater to these accounts under certain conditions. The AWS Rules describe under what circumstances the groundwater allowance can increase. The amount of allowable groundwater granted to new applicants for DAWS and CAWS is reduced over time, reducing to zero groundwater allowance in 2025 in the PRAMA.

The AWS Rules also allow for adding credits to the groundwater allowance of a DAWS or CAWS through extinguishing grandfathered rights (IGFRs, Type 1 and Type 2 rights) within the same AMA. The methods of calculation of these extinguishment credits described in the AWS Rules and are different for each AMA. Groundwater use reported pursuant to the provider's or subdivision's allowable groundwater volume is considered consistent with the management goal of the AMA although from the aquifer's perspective, it is overdraft.

12.2.2 Underground Storage and Recovery

Not all recovered water is equal under the AWS Rules. When water is stored and recovered from the same area, the stored water recharges the aquifer in the same location as the wells are withdrawing it, and the stored water is adding physical availability to the wells that recover the water from within the area of impact of storage (AOI). Historically, the majority of the recovered water in PRAMA has not been within the AOI. The result of this strategy is water level declines in the vicinity of the recovery wells.

The location where water is stored is important for hydrologic reasons as well. Work done by Doug McMillan and presented to the Coconino Plateau Water Advisory Council in January 2013 indicates that the ideal locations for underground storage and recovery in the PRAMA are: (1) along Granite Creek, just north of Watson and Willow Lakes and continuing linearly for some distance north within the AMA, and (2) along the Agua Fria River near Prescott Valley. This is corroborated by ADWR's most recent calibration of the PRAMA groundwater model. Prescott Valley is already permitted to store a large volume of water near the Agua Fria, and this area has limited additional potential for storage beyond Prescott Valley's recharge permit volumes. However, there is significant hydrologic potential to store along Granite Creek, but there are currently no storage projects located or planned in this area.

12.2.3 Conservation

Efficient use of all water supplies is prudent, especially in the arid southwest. While ADWR conservation programs encourage efficient use of all water supplies, conservation alone will not result in the achievement of safe-yield in the PRAMA. In Chapter 11 of this plan, modifying the interior and exterior models for new residential demand resulted in less than 1,500 acre-feet of annual water savings by the year 2110 in Scenario B and about 3,000 acre-feet of savings by the year 2110 in Scenario C. Annual demand increased by 73 percent (more than 40,000 acre-feet) over the year 2012 demand in all three scenarios. If projected growth does not occur, the AMA can sustain safe-yield for longer, but in a growth scenario, even with conservation, augmentation and multiple other water management strategies will be necessary to achieve and maintain safe-yield beyond 2025.

Municipal GPCD Program and the Non-Per Capita Conservation Program

The GPCD conservation program is only available to Large Municipal Water Providers who hold a DAWS. Large Providers without a DAWS must be regulated under the Non-Per Capita Conservation

Program (NPCCP) which is a best management practices (BMP) program. Regulatory compliance in the NPCCP is based on the implementation of the BMPs and reporting requirements and not on a specific reduction in water use. The Code does require that the NPCCP be designed to achieve water use *efficiency* in the service areas equivalent to the water use efficiency assumed in establishing the GPCD requirements. However, this does not necessarily mean that providers in the NPCCP will achieve the same GPCD *rate* as they would if regulated under the GPCD program. Customers within the service area of a NPCCP provider might be extremely efficient in their use of water; however, the provider's service area could be growing disproportionately between the residential and non-residential sectors. By adding more non-residential demand than residential, even if the new uses are extremely efficient, a provider's GPCD rate is likely to increase because demand has been added without adding commensurate population to keep the GPCD low.

The Code prescribes that the 4MP include, if feasible, additional conservation requirements for non-irrigation uses. The Municipal Conservation Program is included in the category of non-irrigation uses for the 4MP. In the PRAMA, the feasibility of additional conservation varies by water provider. Some providers have almost entirely new service areas, with new homes, low water using landscapes, and, low-flow plumbing fixtures compliant with the current national plumbing code. Consequently, the potential for further reductions in GPCD rates of these providers is low during the management period. Some providers may experience reductions in GPCD rates without implementing any additional conservation measures if the proportion of residential to non-residential demand shifts to be more residential. Reduction or lack of growth in commercial and industrial uses within a service area can result in lower GPCD rates without necessarily any increases in efficiency. Reductions in GPCD *rates* do not necessarily mean that a municipal water provider is increasing *efficiency*.

It should be noted that there are now available plumbing fixtures with flow rates that are lower than the national plumbing code. These products are labeled "WaterSense" *(see http://www.epa.gov/watersense/about_us/what_is_ws.html).* WaterSense is a partnership program with the United States Environmental Protection Agency that seeks to protect the future of the nation's water supply. The City of Prescott is a WaterSense partner. In January of 2013, the City of Sierra Vista in Cochise County passed a water conservation ordinance adopting the WaterSense program for future residential development. Sierra Vista was the first community in the nation in which all new homes will be potentially eligible for WaterSense certification. http://www.kvoa.com/news/sierra-vista-first-community-in-the-u-s-to-adopt-epa-watersense-standards/

12.2.4 Reclaimed Re-Use

The PRAMA has a long history of the use of reclaimed water for turf-related watering. However, ADWR has not historically required the same standard of efficient water use for reclaimed water as it has for groundwater and other sources of supply. As an incentive, the Turf Program in the Industrial Sector allows for each acre-foot of reclaimed water used by a turf facility to be counted as 0.6 acre-foot of water when compliance with the turf facility's maximum annual water allotment is determined. This incentive was originally included in the management plans to encourage the replacement of groundwater with reclaimed water in the turf sector. Continuation of this incentive should be reviewed and possibly removed or reduced during this or future management plans.

Use of septic systems reduces the amount of wastewater that may be reclaimed and reused and septic system leachate cannot be directed to areas where water levels are declining. In contrast, wastewater collected through a centralized sewer system may be treated and stored underground under an enhanced aquifer management strategy. In Chapter 11 of this plan, the projected scenarios assume that all new

growth in the PRAMA will be sewered, whether served potable water via a central distribution system or exempt wells. This results in a significant volume of reclaimed water that will be available for storage and recovery within the area of impact of storage.

There is currently no cut to the aquifer for reclaimed water stored at a constructed underground storage facility as there is for storage at a managed facility, or storage of CAP water in CAP AMAs. This means that 100 percent of the water sent to underground storage, minus evaporative losses and other debits, is recoverable. Whether this is beneficial or not to the AMA in achieving its goal requires further evaluation.

12.2.5 Limits on Use of Surface Water Supplies

In 1998, the City of Prescott and the Chino Valley Irrigation District (CVID) entered into an agreement y the City would make recovered reclaimed water available to CVID, and obtain through a sever and transfer the surface water rights of the district. In years prior to the agreement, the CVID managed Watson and Willow Lakes to meet the needs of agricultural water users. Prescott has been recharging water from the lakes; however, this is complicated and restricted by a court ordered stipulation between CVID and SRP that precludes recharge from the lakes prior to April 1 or after November 30, leaving only a 90 day window for recharge. In addition, Prescott has a desire to maintain a sufficient volume of water in the lakes for recreation. These recharge restrictions and recreational priorities limit the utility of this supply to support Prescott's DAWS. For more information see http://www.cityofprescott.net/_d/water_mgmt_policy.pdf and http://www.cityofprescott.net/_d/annual_report_bw_waterresources2.pdf.

The City of Prescott also has surface water rights for Banning Creek (Goldwater Lake), the Hassayampa River, and Del Rio Springs for more than 3,000 acre-feet per year. However Prescott does not have plans to use those rights to prove an AWS in the foreseeable future. This source could be used to replace groundwater pumping which would move the AMA closer to safe-yield.

12.2.6 Timing and Cost of Imported Supplies

Currently water users in the PRAMA have the authority to import groundwater from the Big Chino Subbasin outside of the PRAMA. Although a pipeline is planned, there are several issues surrounding the importation of this supply, including potential costs and whether other water users could be affected. In addition, the timing of the construction of the pipeline may be an issue if new development is dependent on that supply to proceed.

12.3 POSSIBLE SOLUTIONS

During the fourth management period, ADWR will continue to develop long-term water management solutions to the issues described in section 12.2. ADWR will work with the regulated community as well as others within the PRAMA, to identify issues and develop and implement solutions to water management problems as well as craft a cohesive water management strategy for the entire AMA. Such a strategy would likely include the following components:

- Construction of additional regional underground storage facilities along Granite Creek with recovery wells located in the area of impact of storage.
- Adoption of a seasonal/annual pumping regime to withdraw water from wells when water levels have recovered, and shift pumping to other wells when water levels are declining.

- An increase in the proportion of the AMA population on central sewer, including exempt wells; an increase in the capacity and/or number of wastewater treatment plants to treat the additional wastewater; and an increase in the volume of reclaimed water stored.
- Importation of groundwater from the Big Chino Subbasin or some other supply
- Use of more water from Watson and Willow Lakes to meet water demand and less for recreational purposes, and evaluation of surface water available from the South System from Lynx and Goldwater Lakes.
- Pursuing an allocation of CAP wate,r or another source of supply, which may be able to be used as a water exchange vehicle, allowing more use from local, natural streams to which downstream users have senior rights/claims.
- Adoption of more stringent conservation requirements, such as an ordinance at the municipal or county level requiring WaterSense fixtures.

ADWR has developed additional water demand and supply scenarios extending beyond 2025 which show that the PRAMA can achieve safe-yield and maintain it for some years beyond 2025. Assumptions included in those scenarios are outlined in Chapter 11 of this plan.

In addition, possible solutions related to each issue section described in section 12.2 are discussed in further detail below.

12.3.1 Allowable pumping

Agricultural Solutions

Agricultural pumping is likely to decline to a small proportion of total AMA water demand. Until the year 2025, IGFRs can be extinguished to create credits to help meet the AWS criterion of consistency with the management goal. By the year 2025, it is possible that the agricultural demand sector will be relatively small in the PRAMA, as will its contribution to AMA overdraft.

ADWR will continue to provide technical and conservation planning assistance to the members of the agricultural sector in an effort to increase efficiencies and further reduce groundwater reliance. ADWR will continue to encourage and evaluate incentives for the increased use of reclaimed water by the agricultural sector. Additional infrastructure will be needed for Agricultural users to utilize reclaimed water directly in the PRAMA..

To completely eliminate overdraft in the agricultural sector, agricultural users would need to rely on 100 percent renewable supplies (minus incidental recharge) or be required to replenish groundwater pumping. Further reductions in agricultural groundwater use and increased use of renewable water supplies, combined with enhanced on-farm irrigation water management practices would move the PRAMA closer to safe-yield.

Industrial Solutions

ADWR can request water demand, supply, and acreage information from all turf-related facilities in the PRAMA, and can work cooperatively with golf course superintendents to help courses improve their water use efficiency. ADWR can modify or eliminate the reclaimed use incentive in the turf program, resulting in more efficient use of this renewable supply.

To completely eliminate overdraft in the Industrial sector, Industrial users would need to rely on 100 percent renewable supplies (minus incidental recharge), or be required to replenish groundwater pumping. Alternatively, an incentive could be created for non-turf industrial facilities in PRAMA to switch from using groundwater to use of reclaimed water, or to store and recover reclaimed water in the area of impact of where the water was stored. Golf courses represent one of the best areas in which reclaimed water or other renewable supplies could be directly used. Four of the six golf courses in PRAMA currently use reclaimed water for turf-related watering needs.

The unused Type 1 and Type 2 GFRs in PRAMA may never be fully utilized, and could be extinguished to generate credits for meeting the AWS consistency with goal criterion. Encouraging Industrial users to maximize use of reclaimed water, as well as improve water use efficiency, could help reduce Industrial users' dependency on GFR groundwater pumping.

General Industrial Use (GIU) groundwater withdrawal permits are a permit type that the director shall issue if certain requirements are met. One of these requirements (A.R.S. § 45-515.A.5) states that "the management plan for the active management area can be adjusted to accommodate the intended general industrial use consistent with the achievement of the management goal for the active management area." ADWR has not historically considered that issuance of a GIU permit would require the management plan for any AMA to be adjusted. However, this provision could be further explored during the fourth management period. In the PRAMA there were four active GIU permits as of the year 2012 with a total allotment of about 240 acre-feet per year.

Municipal Solutions

The AWS Rules require new subdivision development to be consistent with achievement of the goal of safe-yield. For the Municipal sector to eliminate its contribution to overdraft, nearly all current, committed and future demand in the PRAMA would need to offset its groundwater use and/or use renewable supplies. Careful management of stored and recovered reclaimed water could stretch the ability of the PRAMA to achieve and maintain safe-yield possibly to the year 2070 (depending on the rate of growth) with imported Big Chino groundwater, increased reclaimed water storage and recovery, and increased use of surface water supplies, coupled with reduced demand, depending on net natural recharge conditions.

Exempt Well Solutions

As outlined previously in this chapter, while unmetered, exempt well usage is estimated to have accounted for approximately 12 percent of municipal water use in the PRAMA in 2012. Previous attempts in the PRAMA to address the exempt well issue have been unsuccessful; however, obtaining additional data on uses of water via exempt wells would help frame the issue and determine its magnitude and spatial impacts. Statutory changes would be required in order to obtain annual water use information regarding exempt wells. Absent statutory changes, county or municipal ordinances could be adopted to restrict exempt wells in the future, or to obtain water use information.

Groundwater Allowance Solutions

The AWS Rules do not specify when a designated provider's groundwater allowance may be used. Most water providers use their groundwater allowance sparingly, implementing a strategy of saving it for times of renewable supply shortage when they must increase their pumping to meet demand. Perhaps the most prudent strategy is to avoid use of the groundwater allowance altogether, which, although currently allowed under the AWS Rules and not regulated, has an impact on the aquifer.

12.3.2 Underground Storage and Recovery Solutions

The location of recharge should be encouraged in areas with the greatest potential for aquifer replenishment. A commitment by the AMA's water users to regional storage and recovery is needed to help address supply concerns.

Considering the location where water is recovered is another important component of water management strategy in the PRAMA, as groundwater levels continue to decline due to groundwater demand exceeding the volume of water that naturally or artificially recharges the aquifer each year.

12.3.3 Conservation

In the PRAMA, conservation alone will not result in achieving safe-yield. However, efficient use of all water supplies is prudent and allows for more water management flexibility. Water that is conserved can be stored for future use, or used to extend economic growth into the future. Conservation includes low water use landscaping and low flow plumbing fixtures. EPA "WaterSense" programs and plumbing fixtures can be adopted for new subdivisions to increase water use efficiency. High exterior demand represents a use of water that cannot be recovered in sewer systems, and thus reduces the volume of reclaimed water that could be stored and recovered as a future supply, and should be avoided. However, extremely low interior demand also reduces sewer flow, and may result in sewer flow and wastewater treatment issues.

Conservation is different from curtailment, which pertains to water use rates for various purposes. Curtailment is a water management strategy usually employed during short-term droughts. Curtailment includes limiting landscape water use and other exterior uses of water such as car washing. Curtailment measures can also include interior use rate changes, such as limiting the length of time and number of cycles that water is used for washing, laundry, and dish cleaning. Extreme conservation and curtailment, while achievable, affect quality of life for many people and are difficult to maintain over the long-term. Therefore, conservation is perhaps best considered one of several water management approaches and tools rather than the only solution.

12.3.4 Reclaimed Re-Use Solutions

Maximizing the availability and control the AMA water users have over reclaimed water can go a long way towards achieving and maintaining safe-yield. Approaches that may be considered include modifying or eliminating the reclaimed water incentive in the turf program, the municipal program or potentially both; connecting more of the AMA's residents to central sewer systems to increase the supply of reclaimed water; and potentially, adopting a cut to the aquifer for reclaimed water stored at constructed USFs.

12.3.5 Limits on Use of Surface Water Supplies Solutions

Policies related to the use of surface water from Watson and Willow Lakes could be re-evaluated to maximize the use of the available supply. Entering into a new agreement with SRP, or possibly a water exchange, could allow increased use of the water in the lakes by the City of Prescott. An additional 17,333 acre-feet of CAP allocation will become available for re-allocation to areas outside the three county CAP Service Area after the year 2020.

Prescott could explore use of their additional surface water supplies, and/or seek to modify or amend the agreement on the use and storage of water from Watson and Willow Lakes.

12.3.6 Timing and Cost of Imported Supplies Solutions

Regional cooperation and coordination is needed to pool all available resources to identify and pay for future imported water supplies. Identifying the supply and the cost of importation needs to be done well in advance. It can take many years, even decades, to realize a project of the magnitude needed to meet the needs of growing communities. Partnerships with other communities, different water interests, and state and federal entities can help with these efforts and can also help meet multiple water management objectives (e.g., water for people, water for the environment).

12.4 SUMMARY

The community of the PRAMA has shown interest in the development of a regional water management strategy, in terms of both supply and demand. Decisions regarding planned per-capita demand, sources of supply used, and locations and types of water supply infrastructure affect the degree to which supplies are available for additional growth or during times of drought. ADWR staff will continue to be available to provide explanation of statutory provisions and water management options to aid in the creation of the community's vision for the future, including geographic information, data analyses, and review of various water demand and supply scenarios using ADWR's hydrologic model. Continuing in the fourth management period, ADWR will work in tandem with the community to develop additional monitoring and planning tools and to help manage water supplies and demands in order to construct the viable economic future that is desired. Analysis and examination of local regulations and individual decisions by water users, as well as possible additional statutory authority, must be further explored during the fourth management period if the PRAMA is to make progress to achieving its water management goal.

Full utilization of groundwater in the PRAMA will require future growth to depend on imported water supplies or water stored and recovered within the area of impact to meet the increased demand. Maximizing the use of treated reclaimed water can defer the costs associated with importing a water supply from outside the PRAMA for a long period of time, and must continue and be expanded during the fourth management period. Maintaining and continuing to strive for a high efficiency of use (a low per-capita use rate) can also partially reduce the amount of any future imported water needed on an annual basis; however, the fluctuating nature of surface water availability must be taken into consideration in future water supply planning in PRAMA. The volume of water that might need to be imported could increase during years where there is little or no surface water available. Earlier focus on increasing the use of renewable supplies and using less groundwater, can also make AMA groundwater a good back-up supply in times of renewable supply shortage.

Ultimately, the challenge for water planners in the PRAMA will be to put available alternative water supplies to efficient beneficial use. Although some water users within the AMA are currently able to put alternative or imported water supplies to beneficial use, others lack either access or sufficient infrastructure to effectively use alternative supplies that are available from within the PRAMA, or imported groundwater from the adjacent Big Chino Subbasin. In order to achieve and maintain safe-yield in the PRAMA, the various water users will need to work together to retrieve and distribute alternative water supplies.

12.5 CONCLUSION

For ADWR to close these "holes in the bucket," ADWR would need additional statutory authority and rule changes. However, ADWR is not the sole authority that could enact changes that could move the PRAMA to achieving safe-yield. Counties and cities, as well as individual choices, can help reduce

groundwater reliance in the PRAMA. It is possible for PRAMA to achieve safe-yield by 2025, and safe-yield can be maintained in PRAMA as far into the future as about 2070 (at projected growth rates), but it will require importation and use of Big Chino groundwater, or some other supply; a diligent commitment to increasing the proportion of the population on central sewer; increasing the efficient use of all water supplies; and careful management of the storage and recovery of reclaimed water as well as direct or indirect use of locally available surface water.

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APPENDIX 12-1
MUNICIPAL GROWTH AND SAFE-YIELD
PRAMA

Water use by the Agricultural sector in the PRAMA continues to decline, and although it may reach a point of stabilization with a few farms remaining in production through the year 2025, the Agricultural sector no longer has a major impact on groundwater pumping within the PRAMA. The Industrial sector in PRAMA, while it has the potential and ability to grow, has not grown much during the historical period of 1985 through 2010. It also does not seem likely to increase much between today and 2025, and Industrial allotments, like those in the agricultural sector, are capped and do not increase. The Municipal sector, in contrast, can continue to grow and expand provided new subdivision growth can meet the requirements of the AWS Rules. Therefore, the Municipal sector is the key factor affecting water demand and supply in the PRAMA, and will continue to be so through 2025 and beyond.

Physical Availability of Water Supplies for AWS Purposes

The management plans are only one water management tool provided to ADWR in statute. In addition to the management plans, ADWR's implementation of the AWS Rules impacts future municipal demand where new subdivisions must prove that the water supply is physically available, among other criteria that must also be proven. At some point, depending on the rate of growth or new subdivisions, all the available groundwater that can be allocated for AWS purposes within the PRAMA will be assigned, and any new subdivision demand will need to be based on physical availability of another source of supply, such as water stored and recovered within the area of impact of storage, surface water with appropriate back up supplies as needed, and/or imported water supplies.

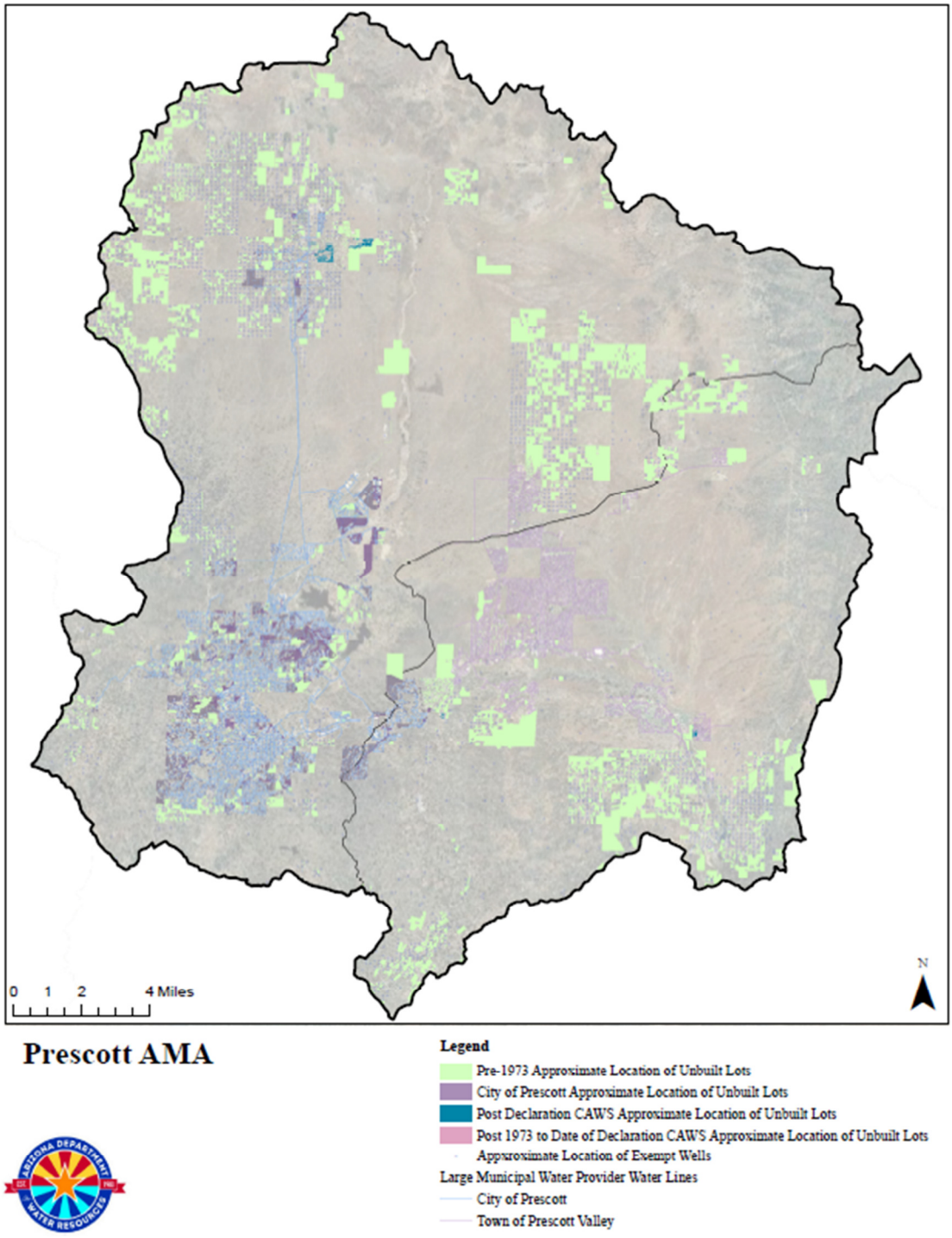
The Assessment included a scenario where Big Chino groundwater begins to be imported into the PRAMA in the year 2020. To date, construction of the necessary infrastructure has not begun and additional issues remain to be resolved before this source of supply can be put to use. Another suggestion that has been made is to harvest water. SB1236 was adopted in April 2012 and includes provisions for a pilot water harvesting program. However, the bill did not include any provision for funding. In addition, HB2363 established a 29-member Joint Legislative Study Committee on Macro-Harvested Water to analyze and evaluate issues arising from the collection and recovery of large scale harvested water. To date, this committee has not yet met. Water harvesting is complicated by surface water law and the adjudication process and may be administratively burdensome to manage. The need remains to find, finance and bring to the tap an alternative water supply to allow long-term, secure continued growth in the PRAMA Municipal sector.

Consistency with the AMA Goal for PRAMA Groundwater Supply

For many years, local water users and ADWR estimated that the PRAMA was in a state of safe-yield. However, with additional data and the development of a detailed hydrologic model, it became apparent that this was not the situation. On January 12, 1999 the director of ADWR declared the PRAMA to be no longer in a state of safe-yield. Legislation adopted during the 1998 session established interim guidelines for applicants for AWS during the public process period required before the director could issue a Final Decision and Order regarding the AMA's safe-yield status. The interim guidelines expired on March 5, 1999. Since then, new development has been required to demonstrate consistency with the AWS Rule criteria for consistency with the safe-yield goal. Thus far, this has been accomplished primarily through the pledging of extinguishment credits, created when agricultural and non-agricultural grandfathered groundwater rights are permanently inactivated and a groundwater credit is subsequently created for use by future development under the AWS Rules. Some developers and municipal water providers have also

pledged long-term storage credits, associated with the artificial recharge of reclaimed water, to offset a portion of the groundwater pumping by new development. Further discussion of the impacts of the Declaration is contained in the 3MP for the PRAMA.

Figure 12-1: Approximate Location of Un-Built Lots in PRAMA



Non-groundwater supplies are consistent with the achievement of the AMA goal, but only a limited volume of additional groundwater pumping from within the AMA could be made consistent with the AMA goal using extinguishment credits because the maximum potential volume of extinguishment credits is finite based on the number of remaining GFRs and the number or years remaining between today and 2025. A significant amount of extinguishment credits in the PRAMA have not been pledged to new subdivisions and could still be used for new AWS determinations provided the groundwater can be proven to be physically available at the proposed location of withdrawal.

It is important to note that there are many hundreds of platted lots within the PRAMA that pre-date the AWS Rules. These lots, located in subdivisions approved prior to the date of Declaration, prior to the AWS Rules, prior to the Code and even prior to the Water Adequacy Program, are not subject to consistency with the AMA goal; nor were they required to prove physical availability of the groundwater supply at the time the subdivision plats were recorded. ADWR has no authority to retroactively require these lots to be consistent with the safe-yield goal. ADWR has estimated that as of 2010, there were more than 7,000 pre-1973 vacant lots in the PRAMA. In addition to these, ADWR estimates more than 4,000 additional lots that were required to prove physical availability of groundwater but were not required to prove consistency with the AMA goal. After the Declaration, ADWR issued CAWS for 1,440 more lots, of which about half are yet to be built. Table 12A summarizes this information. Figure 12A shows the approximate location of these lots.

At some point, the need for imported supplies in PRAMA will be necessary for new AWS to be issued. The cost of importation and who will pay for it, the length of time for construction to be completed, and the rate of future growth are all unknowns that will need to be addressed. Another uncertainty, as in all AMAs, is the impact of climate change. Currently, surface water is a small component of the overall AMA water supply; however, its absence due to drought conditions or long-term climate change could significantly affect its user, the City of Prescott. The City would need to rely on its other sources: groundwater, recovered reclaimed water, and direct use reclaimed water should surface water supply in the future be reduced. The City has a large volume of groundwater allowance granted under the AWS Rules and has proven almost 9,500 acre-feet per year of AMA groundwater to be physically available, so growth could continue in the City based on groundwater for some time into the future.

Table 12-1: PRAMA Historical Water Use Trend by Three Water Use Sectors

Category	ADWR Estimated Un-Built Lots	ADWR # of Lots Issued on CAWS	GW Allowance Granted	Extinguishment Credits Pledged	Estimated Lots Built
Non-CAWS vacant parcels	11,537	-	-	-	Not quantified
1973 to Declaration (1999) Subdivisions	3,049	15,089	-	-	12,040
Post-Declaration (1999) Subdivisions	642	1,440	3,832	26,762	798
Total	15,228	16,529	3,832	26,762	Not Quantified

NOTE: In 2010 the City of Prescott reported 3,398 platted but un-built lots within the City's water service area. These lots count as committed demand according to the AWS Rules. These lots are shown in the table above in the Non-CAWS vacant parcel row.

NOTE: The GW Allowance Granted does not include the City of Prescott's groundwater allowance associated with its DAWS.