

10.0 WATER RESOURCES ELEMENT

10.1 EXISTING CONDITIONS

Water availability is crucial to maintaining a strong economy and good quality of life. Precipitation supplies the water in the aquifer which serves as the primary source of water for the City of Prescott.

Under the Arizona Groundwater Management Code of 1980, the State of Arizona established five active water management areas to prevent groundwater depletion beyond the level being recharged, a condition defined as "safe-yield." The City of Prescott water service area is located within the Prescott Active Management Area (AMA), along with Prescott Valley, Chino Valley, the Yavapai-Prescott Indian Tribe, Dewey-Humboldt and county areas (figure 10-1).

Communities within the AMA draw groundwater based on rights, goals and policies established by the groundwater law and must demonstrate a 100-year assured water supply (AWS) through a program directed at new development. Management plans administered by the Arizona Department of Water Resources (ADWR) establish a water management strategy emphasizing conservation, replacement of existing groundwater, renewable supplies, recharge, and water quality management by all providers within the AMA. Safe yield is the goal by the year 2025. Private domestic use wells are exempted from the 1980 Groundwater Code. According to the ADWR Prescott AMA Assessment, exempt wells have increased steadily from 4,560 in 1985 to 11,035 in 2006.

In 1998 the ADWR determined that the Prescott AMA was no longer in a state of safe yield. This determination capped the amount of groundwater which could be used by the respective jurisdictions within the AMA as a source of assured water for new development.

The City of Prescott water service area accounts for about 8.6% of the land within the Prescott AMA. The groundwater basin aquifers within the AMA are interconnected. Therefore, drawdown in other parts of the Prescott AMA will contribute toward decreased water tables in the Prescott water service area.

Prescott is in a region of relatively moist cool upland slopes below timberline dominated by large coniferous trees. Other areas of the AMA are within the High Desert area of the state's Central Highlands region. Rainfall continues to be below average, with drought conditions being reported by various scientific institutions.

The State's AMA safe-yield is a groundwater management goal, which attempts to achieve and maintain a long-term balance between the amount of groundwater withdrawn and the annual amount of natural and artificial recharge in the AMA (see ARS §45-561.12). The Prescott AMA has not achieved safe-yield, therefore, the current rate of drawdown is not sustainable over the long term.

A.R.S. 9-461.05.

5. A water resources element that addresses:

(a) The known legally and physically available surface water, groundwater and effluent supplies.

(b) The demand for water that will result from future growth projected in the general plan, added to existing uses.

(c) An analysis of how the demand for water that will result from future growth projected in the general plan will be served by the water supplies identified in subdivision (a) of this paragraph or a plan to obtain additional necessary water supplies.

10.2 LEGALLY AND PHYSICALLY AVAILABLE WATER

10.2.1 Legal Availability

Due to the restrictions imposed by the 1980 Groundwater Management Code and the 1998 ADWR declaration of water mining, communities within the AMA must develop additional water supplies to demonstrate the 100 year assured water supply in order to approve new development. Additional water rights acquired must meet standards of legal and physical availability as recognized by the state water code. Water supply is available under State Law when legal documentation exists securing the rights to a specific amount and source of water. The City's current legal document regarding water supplies is known as the 2009 Decision and Order (D&O) authorized and signed by ADWR.

10.2.2 Physical Availability

The physical availability of water resources is dependent upon natural conditions such as the amount of precipitation, evaporation, natural recharge and geology. It is also dependent on the demand placed on the resource by all water users. Since the water policies pursued by an individual jurisdiction affect all jurisdictions in the AMA, water policies are a topic of regional interest. Regional cooperation and coordination will be necessary to maintain an assured water supply for the City and the region. The Yavapai County Water Advisory Committee has been established as a regional coordinating body, with members representing the AMA and other local jurisdictions.

The City of Prescott has pursued an aggressive water management policy since 1985 and has invested in numerous strategies to secure both the legal and physical availability of water for existing and projected water users within the City of Prescott water service area. These resources, as recognized in the City's D&O, include groundwater, surface water and treated effluent supplies used for recharge & recovery. Among the City's water portfolio is the legal right to import up to 8068 acre-feet per year from the Big Chino sub basin (ARS §45-555E and F). The current water resources legally and physically available to the City are presented in Figure 10-2.

Figure 10-2 Current water supplies as allowed by the 2009 D&O.

Groundwater	9,466 af/yr
Treated effluent (recharge and recovery and direct use)	5,446 af/yr
Surface Water (recharge and recovery) Granite & Willow Creeks (net)	1,733 af/yr
Imported Groundwater*	8,068 af/yr
Total legally and physically available water supply	24,713 af/yr
*Imported groundwater is subject to the initiation and completion of infrastructure. City Charter Article VI, Section 16, also requires voter approval for certain high value projects. Of this quantity of imported groundwater 45.9% is committed by intergovernmental agreement to the Town of Prescott Valley. Note: The City holds additional groundwater rights and surface water claims that are not provided for in the 2009 D&O. These rights and claims are held in reserve.	

Without tapping importation rights, the city's current legal and physical availability of groundwater and alternative water sources can cover existing uses and projected allocations to all platted parcels in the water service area. This takes into consideration water demand that had been previously committed for preliminary subdivision plats approved prior to August 1998.

Since the declaration that the AMA is not in safe-yield, the City has taken a conservative approach to the allocation of water to new development through a "water budget" process specifying quantities to be made available. This budget and the policies underpinning it are reviewed and updated by the City Council each year.

10.3 FUTURE GROWTH AND WATER DEMAND

Population growth and development anywhere within the AMA will affect the aquifers and the AMA goal of reaching safe-yield. There are a number of specific threats to safe-yield:

- population growth and resulting increases in aquifer draw-down
- commitment of groundwater to non-residential uses
- drilling of new exempt wells within the AMA

In addition, the aquifer has multiple jurisdictions drawing upon it, which complicates achieving coordinated water management policies and practices which can collectively contribute to safe-yield for the entire AMA. Development patterns and policies in other jurisdictions within the AMA differ from those of the City of Prescott. The City anticipates the need to continue to work with regional water forums to implement a regional coordination strategy.

Meeting the water needs of future residents will require that the City optimize existing groundwater supplies through conservation and maximize alternative water supplies such as reuse or recharge of treated effluent. To meet the demands of the growing population and contribute to the safe-yield goal for the AMA, the City of Prescott anticipates the need to develop additional water sources including importation. To this end, water rights have been secured and infrastructure has been designed for the importation of water from the Big Chino Sub-basin located just north of the Prescott AMA.

Significant aspects relating to the importation of water include monetary, social and environmental issues. Economic factors include the costs of infrastructure, methods of financing and legal issues over water rights. Social impacts include the effects on quality of life and public services caused by population growth made possible by imported water. Environmental considerations include the possibility of affecting surface water flows and increased urbanization, which may in turn affect land, habitats, and air quality.

10.3.1 Treated Effluent Supplies

Treated effluent has become an important water resource for the City of Prescott. When treated, the effluent from the City's water reclamation plants can be used for certain applications, such as irrigation of large turf areas and reducing demand on groundwater supplies. The City supplies effluent to golf courses within the municipal service area. Treated effluent is also used to recharge the aquifer through infiltration basins, where treated effluent water is allowed to percolate into the ground, to be further cleansed through natural processes. The City of Prescott has operated an effluent recharge facility near the airport since 1988. Between 2000 and 2010 the City has recharged an average of 2,500 acre feet per year of effluent. Future plant expansions are planned. Using current techniques for wastewater treatment, the effluent is expected to be treated to A+ federal standards. This is a healthier standard and will allow treated effluent to be available for a wider range of uses.

Work on both of the City's water reclamation plants is included in the 5-year Capital Improvement Plan with the first phase to be completed in early 2014. Class A+ water is an Arizona Department of Environmental Quality requirement for plants that are of 0.25 mgd (million gallons per day) capacity or greater. The Reclaimed Water Quality Standards include two "+" categories of reclaimed water, Class A+ and Class B+. Both categories require treatment to produce reclaimed water with a total nitrogen concentration of less than 10 mg/l (milligrams per liter). These categories of reclaimed water will minimize concerns over nitrate

contamination of groundwater beneath sites where reclaimed water is applied. It will allow for effluent landscape irrigation of areas open to public access. (Source: *Sundog WWTP and Airport WRF Capacity and Technology Master Plan, October 2010 and ADEQ website.*)

Additional methods to optimize this resource include increasing the amount of treated effluent available for recharge by limiting the amount of new turf that must be irrigated, periodic review of effluent pricing, possible financial penalties to customers who exceed their allotment, and improved collection of wastewater in areas currently on septic systems.

10.3.2 Surface Water Supplies

Watson and Willow Lakes and their associated water rights were purchased in 1998. These supplies are an important resource for City water customers. As with treated effluent, lake water is diverted to the City's recharge facility for storage and recovery purposes. This source is recognized in the City's 2009 D&O. The water level of the lakes is contingent upon weather patterns, therefore an inherent uncertainty from year to year exists with this supply. All water supplies require careful management strategies, however, lake water supplies differ due to the need to balance their water supply with open space and recreation functions.

10.3.3 Water Conservation

The City's existing water conservation program encourages Water Smart practices. This program is currently posted on the City's website (www.cityofprescott.net). Other conservation measures that could yield water savings include limiting the sale of additional quantities and direct use of effluent primarily for irrigation purposes, reducing the amount of lost and unaccounted for water by increasing the watertight integrity of the City's distribution system, maintaining financial incentives for conservation, and further public education. Proposed new policies will require careful formulation and subsequent adoption through a public process. Trends in water consumption show greater seasonal use in the summer. Continuing efforts are being made to reduce outdoor water use during the hotter months.

10.3.4 Additional Water Supplies

Serving the anticipated population growth with water has been considered and incorporated in the City's Alternative Water Budget and in ADWR Management Plans for the Prescott AMA. Importation could balance the overdraft and assist in meeting the goal of safe-yield, however, even with importation, a degree of uncertainty exists. The current drought and its potential duration is relevant in ongoing water resources management.

Drought could cause water sources to literally dry up or be challenged legally, placing the community and a larger future population relying upon imported resource in jeopardy of water supply shortfalls. Due to climate related factors and ongoing stream adjudication legal proceedings, our water supply cannot be completely controlled by the City of Prescott.

10.4 WATER RESOURCES LONG TERM MANAGEMENT PLAN

In 2011, litigation ended resulting in recognition of the City of Prescott 2009 Decision & Order (D&O) as the official document defining water availability from the ADWR, which enumerates the sources of water to which the City is entitled. The D&O is based on ADWR examination of water that is physically, legally, and continuously available for 100 years. Now that the City's current and future water rights have been determined, formulation of a long-term water management plan can occur to apply those resources to the City's needs. This plan will take into account all supplies recognized in the D&O, groundwater, surface water, treated effluent, and imported supplies, as well as conservation and an appropriate contribution by Prescott toward meeting safe yield in the AMA. All supplies will need to be assessed for their best use and to secure water for future generations.

10.4.1 Water Availability For Future Development

As discussed earlier, water currently available for the City’s future growth is defined by the 2009 Decision & Order (D&O). The amount of unallocated water available for future growth is defined in an earlier D&O from 2005 where approximately 355 acre feet (AF) remains as of December, 2011. This quantity would support approximately 1014 new homes. The most recent D&O has an additional 1,472 acre-feet which could serve 4,205 residential lots. Should water from the Big Chino Sub-basin be imported this number would increase. Specific reservations have already been made for previously approved and unbuilt residential subdivisions and for tracts of vacant residentially zoned property within the current city limits. Considering that, in 2010, the Census found 22,159 total housing units in Prescott, the following estimate quantifies future growth constrained by water availability:

1998 Plats - Grandfathered Groundwater	
Final Plats	3,398
Preliminary Plats	3,456
Reservation for Residentially Zoned Unwatered Tracts	1,920
Current Alternative Water Balance (355 AF)	1,014
2009 Decision and Order	
Alternative Water (1,472 AF additional)	4,205
TOTAL	13,993 housing units

The legal, physical and economic availability of water from sources which are known or can be reasonably anticipated, including the costs of water rights and infrastructure to access and deliver water, will be a limiting factor in the future development of Prescott. Even with a strong market demand, the availability of water and capital will determine the long-term growth of the City.

10.5 EMERGING CONTAMINANTS

As defined by the United States Geological Survey and the Environmental Protection Agency, “emerging contaminants” are commonly derived from municipal, agricultural, and industrial wastewater sources and pathways. These newly recognized contaminants represent a shift in traditional thinking as many are produced industrially yet are dispersed to the environment from domestic, commercial, and industrial uses. Emerging contaminants can be broadly defined as any synthetic or naturally occurring chemical or any microorganism that is not commonly monitored in the environment but has the potential to enter the environment and cause known or suspected adverse ecological and(or) human health effects. In some cases, the release of emerging chemical or microbial contaminants to the environment has likely occurred for a long time, but may not have been recognized until new detection methods were developed. In other cases, synthesis of new chemicals or changes in use and disposal of existing chemicals can create new types of emerging contaminants.

10.6 WATER RESOURCES GOALS AND STRATEGIES

Goal 1. Provide a reliable water supply for the city adequate for implementation of this General Plan.

Strategy 1.1 Develop a Long-Term Water Management Plan.

Strategy 1.2 Review annually the city water budget and balance new allocations with available resources in accordance with the City's water management plan.

- Strategy 1.3** Reduce lost and unaccounted for water through monitoring, more accurate reporting, and system improvements.
- Strategy 1.4** Continuously seek, evaluate, and implement additional measures for the City's Water Conservation Program.
- Strategy 1.5** Maintain a water rate structure aligned to conservation.
- Goal 2.** Maintain water supply reliability by optimizing use of the effluent resource component.
 - Strategy 2.1** Maximize recharge of renewable resources, treated effluent and surface water.
 - Strategy 2.2** Encourage extension of sanitary sewers into areas presently served by septic or other alternative disposal systems where feasible to increase return flow to water reclamation plants.
- Goal 3.** Augment City water supplies.
 - Strategy 3.1** Seek additional water resources to reduce depletion of local ground water reserves and contribute to the achievement of "safe-yield" in the AMA.
 - Strategy 3.2** Develop funding strategies to finance new water sources and technologies.
 - Strategy 3.3** Investigate opportunities for enhancing infiltration within watercourses for groundwater replenishment and rainwater macro-harvesting technologies for application within the City of Prescott and the Prescott AMA to increase water supply.
 - Strategy 3.4** Operate City-owned lakes to maximize storage for surface water recharge while maintaining a balance with recreational and habitat values.
- Goal 4.** Increase public information availability, awareness, and involvement in water management.
 - Strategy 4.1** Promote public participation in water policy and initiatives through media outreach and public informational dissemination.
- Goal 5.** Maintain participation in regional water resource and management efforts.
 - Strategy 5.1** Jointly formulate a plan to achieve safe yield within the Prescott AMA with other jurisdictions.
 - Strategy 5.2** Partner with other jurisdictions and contribute funding, where necessary, for development of intergovernmental water management programs.
 - Strategy 5.3** Work with regional partners to influence and modify Arizona state water laws and regulations of significant importance to the City and AMA.