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### Groundwater Resources of the Lower Colorado Region

Tim Henley

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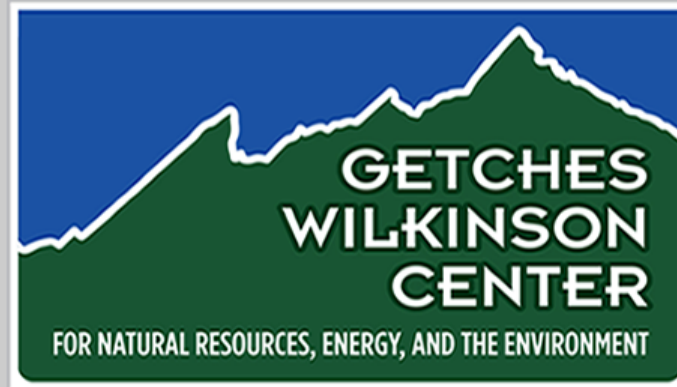
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# Groundwater Resources of the Lower Colorado Region

By Tim Henley, Arizona Department of Water Resources

## Water Supplies – Background

Arizona’s annual water budget is about 7.24 million acre-feet. The water comes primarily from three sources – the Colorado River, in-state rivers, and groundwater. A smaller, but significant, amount of water is provided through use of reclaimed water, primarily to irrigate golf courses, common areas for cities and other recreational areas.

Arizona’s Water Budget – 7.24 MAF	
Colorado River – 2.8 MAF	Groundwater
- 1.3 MAF – Along the River	- 2.9 MAF
- 1.5 MAF – Central Arizona Project	
In-state rivers – 1.4 MAF	Reclaimed water
- 1 MAF – Salt River Project	- 140,000 AF
- 400,000 AF – Gila River	

Historically, agriculture has been the major water user. Irrigation has provided the state with decades of prosperity through citrus, cotton, soybean, alfalfa, and winter vegetables.

As Arizona’s population has grown to about 5.6 million, farmers have retired agricultural lands for conversion to residential development. Agricultural water use has declined as a percentage of total water consumption.

Arizona’s Water Consumption	
1990	2002
Agriculture - 79%	68%
Municipal - 17%	25%
Industrial - 4%	7%

Arizona is fortunate for having had leaders in the early to mid-20<sup>th</sup> century who saw the need to provide water for the future. It began with the visionary work of men like Morris Udall, Carl Hayden, and John Rhodes. They were Democrats and Republicans second. Above all, they were Arizonans. They were small in number, but their combined energy acted as a force multiplier. They succeeded in bringing the Colorado River to Central Arizona where the people would be. Without their achievements, Arizona would be a far different and much less attractive place to live and work.

## Surface water -

According to state law (A.R.S. 45-101.9) “(S) urface water means the waters of all sources, flowing in streams, canyons, ravines or other natural channels, or in definite underground channels, whether perennial or intermittent, floodwater, wastewater or surplus water, and of lakes, ponds and springs on the surface.”

Additionally, the term “surface water” is deemed to include Central Arizona Project water.

Under another section of Title 45, surface water is characterized further:

"The waters of all sources, flowing in streams, canyons, ravines or other natural channels, or in definite underground channels, whether perennial or intermittent, flood, waste or surplus water, and of lakes, ponds and springs on the surface, belong to the public and are subject to appropriation and beneficial use..."

"Beneficial use" is the basis, measure and limit to the use of water.

The water right is subject to forfeiture and may revert to the public if it is unused for five consecutive years, except if it is stored underground for future beneficial use.

Appropriation of water in times of shortage is controlled by the principle of "first in time, first in right."

The relative public values of water, in descending order under Arizona law, are:

1. Domestic and municipal uses. Domestic uses shall include gardens not exceeding one-half acre to each family.
2. Irrigation and stock watering.
3. Power and mining uses.
4. Recreation and wildlife, including fish.
5. Water placed in storage that is deemed "nonrecoverable."

## **Groundwater**

The statute defines groundwater as "water under the surface of the earth regardless of the geologic structure in which it is standing or moving. Groundwater does not include water flowing in underground streams with ascertainable beds and banks."

Groundwater generally is located in a "basin," which is an area enclosing a relatively hydrologically distinct body or related bodies of groundwater. There are 50 groundwater basins in Arizona.

## ***The History of Groundwater in Arizona***

\* - Significant events

### **1863 - Arizona Territory Established**

Arizona is declared a U.S. territory by President Lincoln, making it separate from the New Mexico Territory.

### **1864 - Howell's Code**

The first Arizona Territorial Legislature adopts Howell's Code, which establishes appropriative rights to surface water.

### **1877 - Desert Land Act**

Passed by Congress on March 3 to encourage and promote the economic development of the arid and semiarid public lands of the Western United States. Through the Act, individuals may apply for a desert-land entry to reclaim, irrigate, and cultivate arid and semiarid public lands.

### **\* 1902 - National Reclamation Act**

This act by President Theodore Roosevelt recognizes that a key component to Western growth and development is constructing a system of irrigation works for the storage, diversion, and development of water.

This act, which also created the U.S. Reclamation Service (later the Bureau of Reclamation) provides that “. . . the right to the use of water acquired under the provision of this act shall be appurtenant to the land irrigated and beneficial use shall be the basis, the measure, and the limit of the right.”

**\* 1904 - *Howard v. Perrin***

The Arizona Territorial Supreme Court ruling in this case (upheld in 1906 by the U.S. Supreme Court) established a definite distinction, in character and ownership, between surface water and groundwater. This decision adopted the idea that percolating water was the property of the overlying landowner and not subject to appropriation as surface water.

**\* 1908 - *Winters v. United States***

Recognizes Indian water rights are established when a reservation is created, regardless of whether a tribe previously had used water.

**1911 - Theodore Roosevelt Dam completed**

This structure was the first multipurpose project built by the Bureau of Reclamation. The dam is located 76 miles northeast of Phoenix at the confluence of the Salt River and Tonto Creek where it is operated and maintained by the Salt River Project.

**1912 - Arizona Statehood**

Arizona is accepted for statehood by President Taft and becomes the 48<sup>th</sup> state on February 14, 1912.

**1918 - *McKenzie v. Moore***

This decision reinforced the concept of subsurface spring water as nonappropriable groundwater.

**1919 - Public Water Code**

Legislation is enacted to establish procedures for developing a right to use appropriable water. These procedures go beyond the prior practice of merely putting the water to beneficial use or posting a notice and recording a water right claim.

**\* 1922 - Colorado River Compact**

The Compact divides the Colorado River Basin into an Upper and Lower River Basin and apportions 7.5 MAF of Colorado River water per year to each basin.

Arizona refuses to ratify the Compact (but signs it in 1944) because of concerns over how its tributary waters from the Salt and Gila Rivers will be counted in the apportionment.

Article VII, inserted at the insistence of Herbert Hoover, the commission's federal chairman, states “Nothing in this compact shall be construed as affecting the obligations of the United States of America to Indian Tribes.”

**1926 - *Pima Farms Company v. Proctor***

In deciding this case (appealed from the Pima County Superior Court) the U.S. Supreme Court upheld the distinction between surface water and percolating water. They found that water flowing underground within well-defined channels was not percolating water and was subject to prior appropriation.

**\* 1928 - Boulder Canyon Project Act**

Authorizes construction of the Hoover Dam on the condition that the Colorado River Compact is ratified. This act provides a mechanism for approval of the Colorado River Compact that does not require Arizona's approval.

**\*1931 - *Maricopa Co. Municipal Water Conservation District v. Southwest Cotton Co.***

The Arizona Supreme Court reverses the judgment of the Superior Court, identifying subflow as another source of appropriable water. Subflow is considered water seeping through the streambed or from lands under or immediately adjacent to the stream, and are themselves part of the surface stream.

**\*1932 - *Maricopa Co. Municipal Water Conservation District v. Southwest Cotton Co.***

This decision includes a test for subflow waters, stating that if the drawing off of subsurface water directly and appreciably diminishes the flow of the subsurface stream, then it is subflow.

**1938 - First Groundwater Study Group**

Governor Stanfield appoints a group to study groundwater in response to growing concern over increased groundwater pumping. The efforts of this group lead to a legislature appropriation to the U.S. Geological Survey to study and report on state groundwater conditions.

**1944 - Arizona approves the Colorado River Compact**

Arizona approves the Colorado River Compact in hopes of getting approval for a reclamation project to deliver Colorado River water to central and southern Arizona. Arizona then enters into negotiations concerning the Central Arizona Project.

**\*1945 - Arizona's first Groundwater Code is adopted**

The Bureau of Reclamation warns that the CAP will not be approved without restrictions on groundwater use. The federal government holds Arizona to its claim that construction of the CAP would reduce groundwater use instead of allowing for more groundwater use by agricultural users. Legislation is passed, but only requires the registration of wells throughout the state.

**1948 - Critical Groundwater Code is adopted**

The Federal Government again warns that the funding for the CAP will not be approved without a more meaningful Groundwater Code. The 1948 Code limits development of new wells drilled for groundwater-irrigated agriculture in 10 designated critical groundwater areas, but did nothing to apportion use among landowners in those areas and allowed groundwater pumping to continue at historic levels.

**1951 - Arizona's second Groundwater Study Commission is formed**

In response to the widely criticized provision in the 1948 Groundwater Code that allowed groundwater pumping to continue at historic levels within critical areas, the second Groundwater Study Commission is formed to draft a new groundwater bill. The Legislature failed to pass any of the Commission's recommendations and the Commission ultimately was abolished.

**\* 1952 - *Bristor v. Cheatham I***

Controversial decision by the Arizona Supreme Court that stated percolating waters were subject to prior appropriation and that appropriation of water for domestic purposes constituted the highest beneficial use. This ruling reverses nearly 50 years of common law that had stated that percolating water was not subject to prior appropriation.

**1953 - *Bristor v. Cheatham II***

This decision identified the American common law principle of reasonable use pertaining to groundwater. Specifically in this case, the water in question was not put to beneficial use on the land from which it was pumped, but rather used to irrigate non-adjacent property three miles from the well site.

**1955 - *Southwest Engineering Co. v. Ernst***

The plaintiff seeks legal recourse, claiming that the restrictions applying to the critical groundwater areas designated by the 1948 Groundwater Code are unconstitutional. The decision upheld the general concept that certain areas may be managed differently, and specifically that the additional restriction placed on agricultural groundwater users within areas designated by the 1948 Code as critical was not in and of itself unconstitutional.

**\*1963 - *Arizona v. California***

Following 11 years of litigation, the decision in *Arizona v. California* results in major power shifts between the states and the federal government.

Colorado River water was apportioned, with California receiving 4.4 MAF, Arizona 2.8 MAF and Nevada 300,000 AF, with each state also awarded all the water in their tributaries.

*Arizona v. California* opened the door for federal participation in Colorado River affairs, which many state delegates had hoped to avoid through the Colorado River Compact.

The decision interpreted the Boulder Canyon Act as empowering the Secretary of Interior to act as water master of the Lower Colorado River, to apportion future surpluses and shortages among the states and even among users within the states.

**\*1968 - Colorado River Basin Project Act**

The construction of the Central Arizona Project is authorized through the Colorado River Basin Project Act. The Act contains a provision that safeguards California's 4.4 MAF entitlement, stating that in times of shortage this full amount will be delivered before any water is provided for the CAP. The stated legislative purpose of the Act calls for "...furnishing irrigation water and municipal water supplies to the water deficient areas of Arizona and western New Mexico..."

**1969 - *Jarvis v. State Land Department I***

The decision resulted in an injunction against the City of Tucson, prohibiting them from transporting groundwater from city-owned well fields in the Avra and Altar Valleys. Both areas were designated as critical by the 1948 Groundwater Code. The court held that the property right to use the water was limited by the reasonable use doctrine on overlying land, not ownership.

**1970 - *Jarvis v. State Land Department II***

This decision uses surface water statutes to modify the injunction placed against the City of Tucson in 1969. The determination of appropriative rights (based on A.R.S. 45-147) gives preference to domestic and municipal uses over agricultural uses. However, Tucson was allowed to pump and transport the "annual historic maximum use" following the purchase and retirement of irrigated farmland.

**1973 - Construction of the CAP Canal begins at Lake Havasu City****1974 - Water Rights Registration Act**

Allowed individuals alleging a water right claim that existed before June 12, 1919 to file a claim with the state.

**1976 - *Jarvis v. State Land Department III***

The decision of *Jarvis v. State Land Department II* is modified, allowing the City of Tucson to pump only 50 percent of the "annual historic maximum use."

**\*1976 - Farmer's Investment Company v. Bettwy**

This case involved water transportation issues within a critical groundwater area, beginning with a mining company's transportation of water for use miles from where it was pumped, and eventually including the City of Tucson. In granting an injunction in favor of the plaintiff, the court found that under the reasonable use doctrine, water could not be pumped from one area for use in another area if other wells suffered injury or damage as a result, although the two areas overlie a common source. The injunction was never acted upon, leaving it up to the Legislature to establish a system of preference for rights based on economic interests, and opposing the findings of *Jarvis v. State Land Department*, limited the City of Tucson withdrawals to pre-1972 levels.

**1977 - Stockpond Water Rights Registration Act**

Granted statutory recognition of stockponds.

**1977 - Amendments to the 1948 Groundwater Code**

As a result of the FICO decision, the 1977 Amendments to the 1948 Code established a permit system for the transportation of groundwater. A 25-member Groundwater Study Commission was also established, charged with developing a new Groundwater Code that would address groundwater transportation and reduce groundwater overdraft occurring in parts of the State.

**1977 - Federal Budget Cuts**

President Carter announces that the CAP is among several Federal projects whose funding will be cut but later removes the CAP from this "hit list."

**1979 - Groundwater Study Commission releases its Draft Report of Tentative Recommendations**

Secretary of the Interior Cecil Andrus warns that funding for the CAP will not be allocated unless the State passes a Groundwater Code.

**\*1980 - Groundwater Management Code is passed and adopted.**

The Arizona Department of Water Resources is created to administer Code provisions.

**1984 & 1985 - First Management Plans are adopted**

The first of the five Management Plans called for by the Groundwater Management Act are adopted by the Arizona Department of Water Resources for the Phoenix, Pinal, Prescott, and Tucson Active Management Areas.

**1986 - The Lakes Bill**

Generally restricts the construction of bodies of water larger than 12,320 ft<sup>2</sup> with most kinds of groundwater and CAP water if it is to be used for landscape or scenic purposes.

**1989 - Second Management Plans are adopted**

The Arizona Department of Water Resources for the Phoenix, Pinal, Prescott, and Tucson Active Management Areas adopts the second of the five Management Plans called for by the Groundwater Management Act.

**1990 - Indirect Recharge**

The Groundwater Code is amended to promote indirect recharge of excess CAP water.



**\*1991 - Groundwater Transportation Act**

Severely restricted the ability of a municipal provider to transport groundwater from rural subbasins to the Phoenix, Pinal, Prescott, and Tucson Active Management Areas, except those operating under a previous agreement.

**1993 - Central Arizona Groundwater Replenishment District**

CAGRDR is established to serve as a groundwater replenishment entity for member lands under the Central Arizona Water Conservation District.

CAGRDR can replenish excess groundwater use by lands enrolled in the replenishment district, and therefore assist in meeting requirements of the assured water supply program.

**1994 - Underground Water Storage, Savings, and Replenishment Act**

The Legislature repeals previous enactments and consolidates all storage programs into a unified program.

**1993 - Water Protection Fund**

Administered by a commission which issues grants from the fund to water users for implementing projects to protect Arizona rivers and streams, including the use of excess CAP water for riparian enhancement.

**1995 - Assured Water Supply Rules**

The Assured Water Supply Rules call for Certificates and designation of Assured Water Supply to be demonstrated primarily through the use of renewable water supplies.

**\*1996 - Arizona Water Banking Authority**

Created as a mechanism for Arizona to fully utilize its CAP allotment. The Water Bank may annually purchase all or part of the state's unused allotment and store it through recharge. The legislation also allowed the Water Bank to store water for other jurisdictions beside the state of Arizona.

**1999 - Third Management Plans are adopted**

The Arizona Department of Water Resources for the Phoenix, Pinal, Prescott, Santa Cruz, and Tucson Active Management Areas adopts the third of the five Management Plans called for by the Groundwater Management Act.

**2000 - Governor's Water Management Commission**

Governor Jane Dee Hull announces the formation of the Governor's Water Management Commission.

**2003 – Governor's Drought Task Force**

Governor Janet Napolitano appoints multiagency group to find answers to short- and long-term water shortages.

## **GROUNDWATER MANAGEMENT ACT**

### **Introduction**

In 1986, the Ford Foundation selected Arizona's Groundwater Management Code as one of the 10 most innovative programs in state and local government. Passage of this hallmark legislation in 1980 was a major landmark in Arizona's efforts to preserve its most vital natural resource. This achievement came about in large part because Arizonans, working together and compromising when necessary, addressed our state's unique and specific needs. The result was an innovative law establishing a comprehensive and effective approach to groundwater management.

Developing the Arizona Groundwater Management Code required answering some hard questions, including:

- How much groundwater does Arizona have?
- Who should be allowed to use that water?
- For what purposes should groundwater be used?
- How much should be withdrawn for specific uses? And,
- How can Arizonans keep track of groundwater withdrawals?

In answering these questions, Arizonans realized water is not private property, but rather is a public resource that should be regulated for everyone's benefit.

### **Why The Need For Regulation**

Historically, Arizonans have pumped groundwater faster than it was replaced naturally - a condition known as "overdraft."

Groundwater overdraft creates significant problems, including increased costs for drilling and pumping and the eventual loss of supply. Water quality also suffers because groundwater pumped from greater depths typically contains more salts and minerals. In areas of severe groundwater depletion, the earth's surface may sink, or "subside," causing cracks or fissures that can damage roads, building foundations, and other underground structures.

Recognizing continued depletion of finite groundwater supplies as a threat to prosperity and quality of life, the Arizona Legislature created the framework to manage the state's water supply for the future.

### **Code Provisions**

The 1980 Groundwater Management Code (Code) has three primary goals, to:

1. Control severe overdraft occurring in many parts of the state.
2. Provide a means to allocate the state's limited groundwater resources to most effectively meet the changing needs of the state; and
3. Augment Arizona's groundwater through water supply development.

To accomplish these goals, the Code set up a comprehensive management framework and established the Arizona Department of Water Resources (ADWR) to administer the Code's provisions.

The Code established three levels of water management to respond to different groundwater conditions:

- The lowest level of management includes general provisions that apply statewide.
- The next level of management applies to Irrigation Non-Expansion Areas (INAs).
- The highest level of management, with the most extensive provisions, is applied to Active Management Areas (AMAs) where groundwater overdraft is most severe.

The boundaries of AMAs and INAs generally are defined by groundwater basins and sub-basins rather than by the political lines of cities, towns, or counties.

The Code created four AMAs - Phoenix, Pinal, Prescott, and Tucson. A fifth AMA, the Santa Cruz AMA, was formed from a portion of the Tucson AMA in 1994.

Three INAs were established in rural farming areas where the groundwater overdraft problem is less severe. Two INAs, at Douglas and Joseph City, were created by the Code; ADWR established the Harquahala INA in 1982.

The Department has the authority to designate new AMAs and INAs if it is necessary to protect the water supply. Local residents also may vote to create INAs or AMAs.

Most attention focuses on water management activities within AMAs. Provisions for the state's five AMAs are the most comprehensive because of the magnitude of overdraft in these areas. The AMAs include 80% of Arizona's population and 70% of the state's groundwater overdraft.

In the Phoenix, Prescott, and Tucson AMAs, which include the large urban areas of the state, the primary management goal is to attain "safe-yield" by 2025. Safe-yield is defined as a long-term balance between the annual amount of groundwater withdrawn in the AMA and the annual amount of natural and artificial recharge.

In the Santa Cruz AMA, where significant international, riparian and groundwater/surface water issues exist, the goal is to maintain safe-yield and prevent local water tables from experiencing long-term declines.

In the Pinal AMA, where a predominantly agricultural economy exists, the goal is to allow the development of non-irrigation water uses, extend the life of the agricultural economy for as long as feasible, and preserve water supplies for future non-agricultural uses.

The Code contains six key provisions:

1. Establishment of a program of groundwater rights and permits.
2. A provision prohibiting irrigation of new agricultural lands within AMAs.
3. Preparation of a series of five water management plans for each AMA designed to create a comprehensive system of conservation targets and other water management criteria.
4. Development of a program requiring developers to demonstrate a 100-year assured water supply for new growth.
5. A requirement to meter/measure water pumped from all large wells.
6. A program for annual water withdrawal and use reporting. These reports may be audited to ensure water-user compliance with the provisions of the Groundwater Code and management plans. Penalties may be assessed for non-compliance.

## **1. Groundwater Rights in AMAs**

Determining who may pump groundwater -- and how much they may pump -- is a vital part of groundwater management. This involves identifying existing water rights and providing means for water users to initiate new withdrawals. Within an AMA, a person must have a groundwater right or permit to pump groundwater legally, unless the person is withdrawing groundwater from an "exempt" well. A well is considered "exempt" if it has a maximum pump capacity of 35 gallons per minute.

Exempt wells may be used to withdraw groundwater for non-irrigation purposes and are generally used for domestic purposes, including watering less than two acres of grass or garden. Exempt wells must be registered with ADWR but are subject to fewer requirements than non-exempt wells within AMAs and INAs.

Non-exempt wells have a pump capacity greater than 35 gallons per minute. The following types of rights or permits are required to withdraw water from non-exempt wells in AMAs:

- Grandfathered rights,
- Service area rights, and
- Withdrawal permits.

### **Grandfathered Rights**

Three types of rights are derived from past individual water use; they are known as "grandfathered rights."

- Irrigation grandfathered rights,
- Type 1 non-irrigation grandfathered rights, and
- Type 2 non-irrigation grandfathered rights.

Each is described below.

An **Irrigation grandfathered right** confers the right to irrigate specific plots of land that had been irrigated with groundwater between 1975 and 1980. Land without an Irrigation grandfathered right may not be irrigated with groundwater. Under the Code, "irrigate" means to apply water to two or more acres of land to produce plants for sale or human consumption or as feed for livestock.

An Irrigation grandfathered right specifies how much groundwater may be used. That amount will vary over time, according to a formula established in the management plans. An Irrigation grandfathered right may not be sold apart from the associated land.

A **Type 1 right** is associated with land permanently retired from farming and converted to a non-irrigation use, e.g., building a new industrial plant or a subdivision. This right, like an Irrigation grandfathered right, may be conveyed only with the land. The maximum amount of groundwater that may be pumped each year using a Type 1 right is three acre-feet per acre.

Groundwater withdrawn under a **Type 2 right** can only be used for a non-irrigation purpose. The right is based on historical pumping of groundwater for a non-irrigation use and equals the maximum amount pumped in any one year between 1975 and 1980. Examples of non-irrigation uses include industry, livestock watering, and golf courses.

Type 2 rights are the most flexible because they may be sold separately from the land or well. In addition, the owner of a Type 2 right may, with ADWR approval, withdraw groundwater from a new location within the same AMA. It is possible to lease a portion of a Type 2 right, but if the right is sold, it may not be divided; instead, the entire right must be sold.

### **Service Area Rights**

Most Arizonans receive domestic water through service area rights. Service area rights authorize cities, towns, private water companies, and irrigation districts to withdraw groundwater to serve their customers.

### **Withdrawal Permits**

These permits allow new withdrawals of groundwater for non-irrigation uses within AMAs. There are eight types of withdrawal permits covering various groundwater uses that are subject to different requirements. Examples of withdrawal permits include general industrial use permits, dewatering permits, and poor-quality groundwater-withdrawal permits.

## Conditions on Water Rights and Use

Each type of permit or right is subject to certain conditions, particularly as to the quantity and purpose of the groundwater use. For example, the distinction between irrigation and non-irrigation use is critical. Note: Every permit or right, except a right based on an exempt well, is subject to the conservation requirements in the management plans for each AMA.

## 2. No New Irrigation in AMAs

Unless agricultural irrigation occurred between 1975 and 1980 and the user received an irrigation grandfathered right for those historic agricultural acres, no land may be put into production within an Active Management Area. Only those lands that have been certified, based on historic water use, may continue to be irrigated with groundwater.

## 3. Management Plans for AMAs

Among other things, the Code directs ADWR to develop and implement water conservation requirements for agricultural, municipal, and industrial water users in five consecutive periods:

- First Management Period: 1980 - 1990
- Second Management Period: 1990 - 2000
- Third Management Period: 2000 - 2010
- Fourth Management Period: 2010 - 2020
- Fifth Management Period: 2020 - 2025

The management plans will contain more rigorous water conservation and management requirements with each successive period.

## 4. Assured Water Supply

In an AMA, anyone who offers subdivided or unsubdivided land for sale or lease must demonstrate an assured supply of water to ADWR before the land may be marketed to the public. To receive an assured water supply certificate from ADWR, a developer must demonstrate that:

1. Water of sufficient quantity and quality is available to sustain the proposed development for 100 years,
2. The proposed use is consistent with the management plan (e.g., it adheres to conservation requirements) and achievement of the AMA management goal (e.g., it does not hinder achievement of safe-yield), and
3. The water provider has the financial capability to construct water delivery and treatment systems to serve the proposed development.

Alternatively, the developer can locate the proposed development within the service area of a city, town, or private water company with a Designation of Assured Water Supply from ADWR. If a "designated" provider will serve the subdivision, the developer need only obtain written commitment of service from the water provider.

In 1995, ADWR adopted new Assured Water Supply Rules, primarily to support the groundwater management goals. The rules require new developments to be sustained predominantly by renewable supplies, such as surface water (including effluent and Colorado River water delivered via the Central Arizona Project.)

## 5. Water Measurement

Rightholders who pump groundwater from non-exempt wells in an AMA must measure those withdrawals using an approved measuring device or method.

## 6. Annual Reporting and Withdrawal Fees

Users who pump groundwater from non-exempt wells in AMAs also must report annual pumpage to ADWR. This provision helps ADWR determine how much water is being used and where it is being used.

The Code also requires users to pay an annual groundwater withdrawal fee. The fee is used to offset the cost of managing this resource and to fund the augmentation efforts of the Arizona Water Banking Authority. Withdrawal fees also may be used for conservation assistance, augmentation projects and, after 2006, retirement of irrigated land.

## ASSURED WATER SUPPLY

The Assured Water Supply (AWS) Program has played a major role in increasing the use of renewable supplies in the municipal sector, thereby reducing reliance on mined groundwater.

At its core, the AWS program is tied to subdivision growth. The development of new subdivisions is what triggers the AWS requirements. The Code included an AWS Program.

Rules for the AWS Program became effective in 1995. It is a refinement of the Water Adequacy Program established by statute in 1973<sup>1</sup>. The purposes of the program are to:

- Provide long-term certainty regarding water supply availability for new subdivisions;
- Promote long-range water supply planning in areas with significant water management problems; and
- Ensure that renewable supplies are used to meet the demands of municipal growth.

This is accomplished through regulations that limit the use of groundwater by new subdivisions and designated water providers. The AWS Program also serves a consumer protection role by requiring developers to demonstrate that sufficient water supplies are available for new subdivisions before a lot can be sold.

Administrative rules for the AWS program were adopted on February 7, 1995. They detail the requirements for an AWS based on statutory guidelines (A.R.S. § 45-576) and administrative rules (R 12-xxx). There are five basic AWS requirements an applicant must demonstrate:

1. Physical, legal, and continuous availability of the water supply for 100 years (R12-15-703).
2. Sufficient quality of the water supply (R12-15-704).
3. Water use will be consistent with the management goal of the AMA (R12-15-705).
4. Water use will be consistent with the management plan of the AMA (i.e. conservation requirements) (R12-15-706).
5. Financial capability to construct any necessary water storage, treatment, and delivery systems (R12-15-707).

Applicants for an AWS must meet each of these requirements. An AWS can be granted to a subdivision or a city, town or private water company. Subdivisions are granted Certificates of AWS and a city, town, or private water company's service area can be granted a designation of AWS. The AWS program applies to subdivisions, defined in A.R.S. § 32-2181 as six or more lots, any one of which is less than 36 acres, which will be sold, or leased for more than a year.

This includes residential and commercial subdivisions. New subdivisions not receiving water from a provider designated as having an AWS are required to obtain a Certificate of AWS before the subdivision plat<sup>2</sup> can be recorded or a public report issued by the Arizona Department of Real Estate (ADRE). For subdivisions within the service area of a city, town or private water company with a

designation of AWS, the subdivider does not apply to the Department of Water Resources (Department) for a Certificate of AWS but must have a written commitment of service from the designated provider for the proposed subdivision before the subdivision plat can be recorded or a public report issued by the ADRE.

To become designated as having an AWS, a city, town, or private water company must demonstrate adequate supplies for its current, committed, and a minimum of two years of projected demand. The provider must be able to meet at least this amount of demand for 100 years. For designated water providers the determination of the 100-year AWS is on-going.

Thus it is not a fixed 100 years (i.e. only good through 2100), but a rolling 100-year period.

Review of a designated water provider's status is required at least every 15 years, as prescribed in the Rules. However, information obtained through annual reporting requirements is reviewed on an annual basis to ensure compliance with the AWS Rules. A designation may be revoked if the water provider is found to no longer have an AWS as defined in the Rules.

### **Central Arizona Groundwater Replenishment District**

The Central Arizona Groundwater Replenishment District (CAGRD) was established to provide a method of meeting the "consistency with management goal" requirement in the Phoenix, Pinal, and Tucson AMAs for those Certificates of AWS and designated water providers that could not secure the necessary renewable supplies. Members of the CAGRD report their excess groundwater use to the CAGRD. The CAGRD then replenishes that amount anywhere in the AMA where the use occurred. Excess groundwater is defined in A.R.S. § 48-3701(7) as groundwater delivered in excess of the amount allowed by the AWS Rules. Essentially, excess groundwater is any groundwater delivered that exceeds the amount covered by the groundwater allowance account, incidental recharge (designated providers only), and extinguishment credits.<sup>11</sup> CAGRD membership is restricted to the Central Arizona Project (CAP) service area, which consists of Maricopa, Pinal, and Pima Counties.

Membership in the CAGRD takes two forms: member lands and member service areas. Member lands are subdivisions with a Certificate of AWS. Member service areas are municipal water providers with a designation of AWS. Both types of membership are perpetual. On an annual basis, members report their excess groundwater use to the CAGRD. The CAGRD then determines the cost of replenishment on an acre-foot basis. The collection of those costs differs between the two types of members. Owners of member lands are individually assessed the cost of replenishment for their property on their annual property tax bill. Member service areas (municipal water providers) are directly billed by and pay the CAGRD for the cost of replenishment and pass on this cost to customers, typically through their water bills.

### ***Groundwater Replenishment***

Members of the CAGRD (member lands within subdivision and certain municipal water providers), who use water in excess of their groundwater allowance (under the AWS Rules), must have that water replenished by the CAGRD. Title 48 requires that the replenishment must take place in the same AMA as the use and it must happen within three years of the CAGRD incurring the obligation. However, there is no requirement that the replenishment take place near or at the point of water withdrawal. This means that the groundwater withdrawal need not occur in the same sub-basin where the replenishment takes place. There is concern that water use will deplete an aquifer in one area, while other areas within the AMA benefit from the replenishment activities. While this scenario meets the AMA-wide water management goals (safe-yield in Phoenix and Tucson), it does not address sub-area or critical area management issues.

## WATER BANKING

In the mid-1990s, Arizona determined it was faced with a unique problem – even though the Central Arizona Project canal had been built, there were not enough “customers” to take all the water – 1.5 MAF a year – that central Arizona was entitled to. Water experts concluded that at the present rate it would be many years – perhaps 2030 – before all the CAP water would be claimed.

Arizona faced the possible loss of up to 14 MAF of water it was otherwise entitled to use.

After careful study, hydrologists determined Arizona possessed significant aquifers where excess CAP water could be stored. In 1996, the Arizona Water Banking Authority (AWBA) went into business.

The mission of the AWBA was to store Arizona’s unused CAP allocation. The AWBA also was endowed with other functions and responsibilities, namely to:

- Develop long-term storage credits to firm up existing supplies for municipal and industrial water users both inside and outside of the CAP service area
- Meet the goals of the Arizona Groundwater Management Act and
- Assist in Indian water settlements.

A five-person commission directs the activities of the AWBA. The Director of the Department of Water Resources chairs the AWBA, and members include the president of the board of the Central Arizona Water Conservation District (CAWCD) and three persons appointed by the Governor. By law, of these appointments one person represents CAP municipal and industrial water users, one person represents Colorado River water users along the Colorado River, and one person must be knowledgeable in water resource management issues. Additionally, the Arizona Senate and House of Representatives each appoints one non-voting *ex-officio* member to the AWBA.

Much of the funding for the AWBA comes from existing revenue sources and from fees charged to those benefiting directly from the stored water. Restrictions on the ways these monies can be used depend on the sources of the monies, which include:

- Fees for groundwater pumping collected within the Phoenix, Pinal, and Tucson Active Management Areas (AMAs). Money from this source must be used for the benefit of the AMA in which it was collected.
- A four-cent *ad valorem* property tax in the CAP service area to pay for water storage. Money from this source must be used to benefit the county in which it was collected.

The AWBA has been an unqualified success since it began recharging water in 1997.

Each year the AWBA pays the delivery and storage costs to store Colorado River water in Central and Southern Arizona. The water is delivered through the CAP and is stored underground in existing aquifers (direct recharge) or is used by irrigation districts in lieu of pumping groundwater (indirect or in-lieu recharge.)

Pursuant to state laws governing recharge, the AWBA stores water and accrues long-term storage credits that can be recovered in the future when Arizona’s communities need a backup water supply.

The AWBA has permits to store water at nine underground storage facilities (USFs) in which water is delivered to a storage facility and allowed to percolate into the aquifer below.

The AWBA has permits to store water at thirteen groundwater savings facilities (GSFs), which are agricultural operations that have agreed to forego pumping groundwater in exchange for use of subsidized CAP water. In 2003, for the first time, the amount of water recharged in USFs exceeded the recharge through GSFs.



The AWBA is also authorized to enter into agreements for interstate water banking with our neighbors in the Lower Colorado Basin – California and Nevada. The AWBA has executed all the agreements necessary to participate in interstate water banking with Nevada. In 2002, the AWBA stored water on Nevada's behalf and they accrued 61,000 acre feet of long-term storage credits. Pursuant to the provisions of the interstate agreements and federal law, those credits can be used by Nevada when water is needed to make up shortfalls in supply. At the present time, no interstate water banking agreements have been negotiated with California.