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Arizona Water Management

Arizona's desert climate directly affects our economy and quality of life. All economic activity, including mining, irrigated agriculture, and growth of cities occurs only where dependable water supplies are available. As a result, Arizona places a high priority on managing its limited water to ensure that secure water supplies are available now and well into the future.

WATER SUPPLIES

There are basically four categories of water supplies available in Arizona: Colorado River water, surface water other than Colorado River water, groundwater and reclaimed water. The utility of each type of water depends on its quantity, quality, reliability and economic feasibility.

Surface water

Surface water from lakes, rivers and streams is Arizona's major renewable resource. However, because of our desert climate, the amount of surface water available can vary dramatically from year to year, season to season, and place to place. In order to make the best use of the surface water when and where it is needed, storage reservoirs and delivery systems have been constructed throughout the state. Most notable are the major reservoir storage systems located on the Salt, Verde, Gila and Agua Fria rivers. Almost all of the natural surface water in Arizona has been developed.

Colorado River Water

A separate category of surface water in Arizona is the water supplied through the Colorado River. The federal government constructed a system of reservoirs on the River to harness its supplies for use in several states. Arizona, California, Nevada, New Mexico, Utah, Colorado, Wyoming and Mexico share the River's resources. Rights to use Colorado River water are quantified by a string of legal authorities known as the "Law of the River." Based on this body of law, Arizona has the right to use 2.8 million acre feet annually of Colorado River water. Mohave, La Paz and Yuma county water users rely on Colorado River as their principal water supply. At full utilization, the Central Arizona Project delivers on average 1.5 million-acre feet of Colorado River water to Maricopa, Pinal and Pima Counties.

Groundwater

About 40 percent of the state's water use comes from groundwater sources. Groundwater is found beneath the earth's surface in natural reservoirs called aquifers. In most cases the water stored in these reservoirs has been in place for millions of years. Throughout this Century, groundwater has been pumped out more rapidly than it is being replenished, creating a condition called overdraft. Though a large amount of water remains stored in Arizona's aquifers, its availability is limited by location, depth and quality. By continuing to overdraft the state's groundwater supplies, we challenge our ability to ensure a secure water supply for the future. In recognition of this threat, Arizona implemented the Groundwater Management Code in 1980. The Groundwater Code promotes water conservation and long-range planning of our water resources.

Reclaimed Water

Reclaimed water, or effluent, is the one increasing water source in our state. As our population and water use grows, more treated wastewater will be available. Reclaimed water is treated to a quality that can be used for purposes such as agriculture, golf courses, parks, industrial cooling, or maintenance of wildlife areas.

WATER MANAGEMENT

From its inception as a state, Arizona's courts have dealt with surface water and groundwater separately. Surface water maintained its pre-statehood allocation based on "first in time, first in right," or prior appropriation. Rights to percolating water, or groundwater, were relegated to the courts for some time before any action was taken by the state Legislature to regulate or control its use. The Arizona Groundwater Management Code (Code) was adopted in 1980 in response to threats on the water supplies of two of the state's major economic factions, mining and municipalities; to an ongoing threat by the federal government to halt the long awaited Central Arizona Project (CAP); and in recognition of severe overdraft conditions in several parts of the state.

The Code has three primary goals. The first is to control the severe overdraft of groundwater occurring in many parts of the state. The second is to provide a means to allocate the state's limited groundwater resources to most effectively meet the changing needs of the state. The third goal is to offset Arizona's use of groundwater through renewable water supply development. To accomplish these goals, the Legislature set up a comprehensive management framework and established the Arizona Department of Water Resources (ADWR) to administer the Code provisions. The Code set up three levels of water management to respond to different groundwater conditions. The least restrictive level includes general provisions that apply statewide. The next two levels of management are focused on certain areas of the State designated as Irrigation Non-Expansion Areas (INA) and Active Management Areas (AMA). The geographic boundaries of INAs and AMAs are defined by groundwater basins and subbasins rather than by political divisions. Within INAs, the expansion of irrigated acreage is prohibited (A.R.S. 45-434). Irrigation as defined by the Code is limited to the growing of crops for sale, human consumption, or livestock feeding on more than two acres. AMAs are charged with achieving more stringent management goals than those of INAs.

Statewide Activities

Statewide planning efforts include technical studies of local areas and assistance in projecting future water demands. The Arizona Water Atlas, compiled by ADWR in 2008, is an extensive database that can be used to assist in long-term planning. Statewide regulatory programs and requirements managed by ADWR include well drilling, construction, licensing, registration and abandonment, groundwater transportation restrictions, adequate water supply requirements, artificial recharge and recovery permits, the Water Protection Fund, technical assistance and planning assistance, and rural studies. Additionally, ADWR administers permits to appropriate surface water (other than Colorado River water) based on the Public Water Code enacted in 1919.

Well Drilling, Construction, Licensing, Registration and Abandonment

Those drilling new and replacement wells, or deepening an existing well, are required to file a Notice of Intent (NOI) with the Arizona Department of Water Resources (ADWR), prior to construction. The NOI provides specific information regarding the location and measurement methods for each well and assures that a licensed well driller will construct the well. To ensure safety, water quality, and proper well functioning, ADWR imposes specific construction standards on well drilling. Well drilling licensing requires that an application for a well drilling license be filed with ADWR, provided the applicant can demonstrate three years of drilling experience or can demonstrate a high degree of understanding and knowledge of well drilling techniques. The applicant is required to pass the well drilling license examination administered by ADWR. Satisfactory completion of the examination and submittal of a license fee are required to obtain a well drilling license. The well drilling license number must be prominently displayed on all well drilling rigs owned or operated by the well drilling contractor.

Statute requires that every well be registered with ADWR. A registration form that includes the registration number of any well previously required to be registered, the legal description of the land on which the well is located, the location of the well on the land, the name and mailing address of the owner of the land, the depth, diameter and type of casing of the well, the legal description of the land on which the groundwater is being used, the maximum pumping capacity of the well, and any other information as required must be provided to ADWR. A registration number for each well is then assigned by ADWR.

Well abandonment requires that a Notice of Intention to Abandon be filed with ADWR. Well abandonment must be performed only by a licensed well drilling contractor or a property owner who has obtained a single well license from ADWR.

Groundwater Transportation Restrictions

Groundwater can be transported within a groundwater subbasin, or a groundwater basin without subbasins, without payment of damages, and between groundwater subbasins of the same basin, subject to payment of damages. Groundwater can not be transported between groundwater basins or from a groundwater basin outside an AMA into an AMA basin except for specific transfers grandfathered in by statute. Exceptions to these restrictions are contained in the statutes. These restrictions are intended to protect hydrologically distinct sources of groundwater supplies and the economies in rural areas by ensuring the groundwater is not depleted in one groundwater basin to benefit another one.

Adequate Water Supply Requirements

To ensure consumer protection, new subdivisions are required to demonstrate whether they have an adequate water supply to meet the development's need for 100 years. Outside of an AMA, the subdivision developer must obtain a determination of water adequacy before recordation of the plat for the development. Within AMAs, subdivision developers must obtain a certified or designated assured water supply (AWS), pursuant to A.R.S. § 45-108. The developer must register the water adequacy supply status with the Arizona Department of Real Estate and notify the initial buyer prior to sale.

Surface Water Rights Administration

In Arizona, groundwater and surface water are managed under separate water right systems. While groundwater is based on grandfathered rights within an AMA and on the beneficial use doctrine outside AMAs, surface water rights are based on the doctrine of prior appropriation. Prior appropriation, which is unique to the West, is based on the tenet "first in time, first in right." In other words, the first person to put the water to beneficial and reasonable use acquires a right superior to later appropriators.

The 1919 Public Water Code requires an application to be filed with ADWR for a permit to appropriate surface water. Once the water is actually put to beneficial use, proof of that use is made to ADWR and a Certificate of Water Right is issued to the applicant. If the water is not put to beneficial use for five years, the right could be considered abandoned, after which it reverts to the public domain and again is subject to appropriation.

Currently, over 30,000 claimants, including 11 Indian tribes, are involved in surface water adjudications addressing surface water rights to the Gila River and Little Colorado River systems. In the absence of Indian water right settlements, the adjudication proceedings will determine the amount of water rights held by a particular Indian tribe or other claimant. For additional information on Indian water rights settlements, check the ADWR website at azwater.gov.

Rural Watershed Initiatives

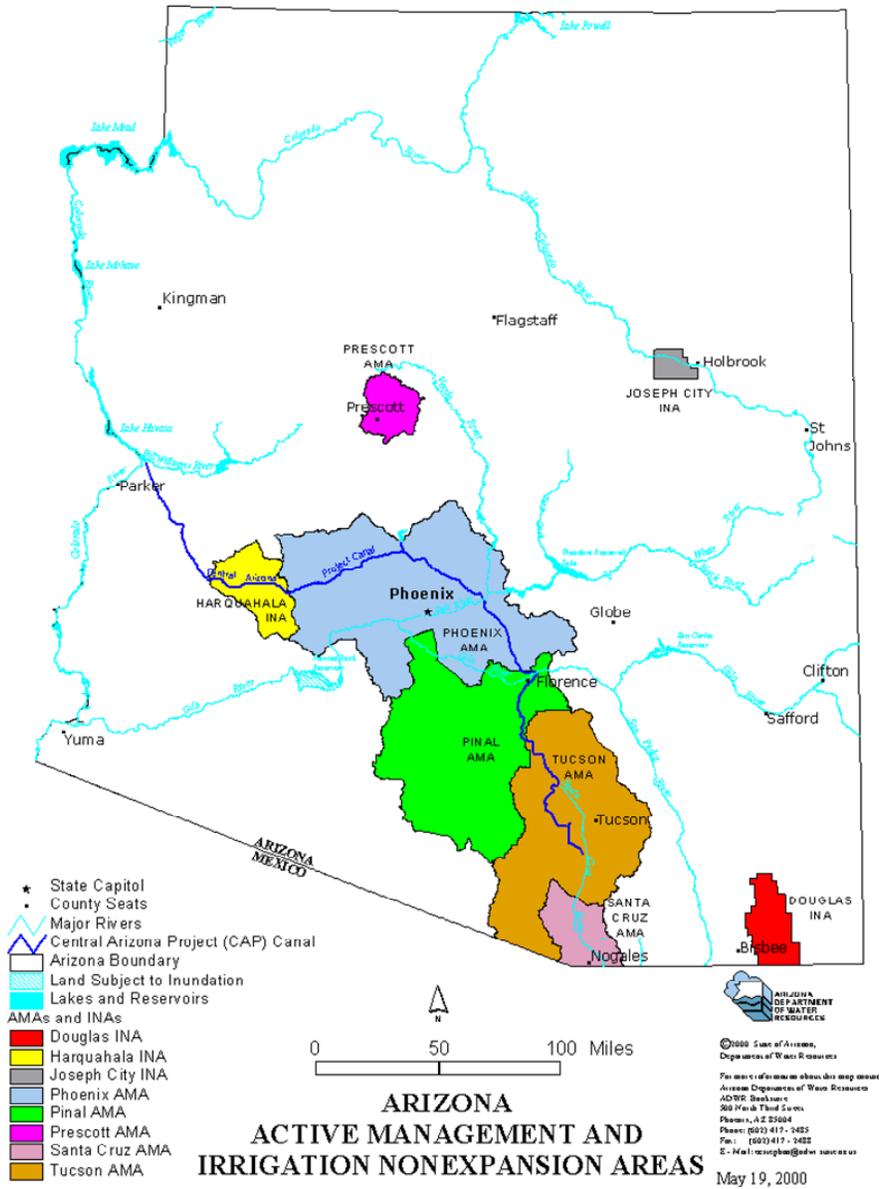
ADWR has been working with rural communities to help them develop locally driven partnerships to address water supply issues on a regional scale. Some of these rural community partnerships include: the Upper San Pedro Partnership, the Northern Gila County Water Plan Steering Committee, the Upper Little Colorado Watershed Partnership, the North Central Arizona Regional Water Planning Partnership, the Verde Watershed Organization, and the San Carlos-Safford-Duncan Watershed Advisory Group. Additional requests for partnerships include: Show Low Creek Watershed Enhancement Partnership, Northwest Arizona Watershed Council, Upper Agua Fria Watershed Partnership, Eagle Creek Watershed Partnership and Little Colorado River Watershed Project. These communities lacked the necessary resources to address many of their water supply problems. ADWR was given authority to administer the initiative by providing technical and financial assistance.

In FY 2000, at the request of then Governor Jane D. Hull, the State legislature appropriated \$1.2 million for ADWR to begin the Arizona Rural Watershed Initiative. In FY 2001, the State legislature appropriated an additional \$500,000 to allow for the continuation of rural studies.

Arizona Water Protection Fund

In 1994 the Arizona legislature created the Water Protection Fund (WPF) administered by a 15-member Commission. The WPF is earmarked for supporting projects that will enhance riparian areas. The WPF is designed to allow the people of this state to prosper while protecting and restoring this state's rivers and streams and associated riparian habitats, including fish and wildlife resources that are dependent on these important habitats. Monies for Fund use are obtained from the Arizona State Legislature, Central Arizona Project (CAP) fees, private gifts, grants and donations.

FIGURE 1 –AZ. WATER MAP



Irrigation Non-Expansion Areas

Three Irrigation Non-Expansion Areas (INAs) were established in rural farming areas where the groundwater overdraft was less severe. The Douglas INA and

the Joseph City INA were established as the initial INAs. The Harquahala INA was designated in 1982.

The management objective in the INAs is the prevention of further declines of groundwater supplies through prohibition of irrigation acreage expansion. Any land not irrigated during the years 1975 through 1980 in the Douglas and Joseph City INAs and during the years 1976 through 1981 in the Harquahala INA cannot now be irrigated. Specific water conservation measures are not required within an INA. The management structure of the INAs includes all of the statewide provisions described above. In addition to the statewide provisions, owners of non-exempt wells (pumping greater than 35 gallons per minute) must use approved measuring devices and submit annual groundwater pumping reports.

New irrigation non-expansion areas may be initiated by the director or by petition to the director of ADWR. The petition must be signed by at least 25 groundwater irrigation users, or one-fourth of the groundwater irrigation users within the boundaries of the groundwater basin or subbasin specified in the petition, or ten percent of the registered voters residing within the boundaries of the groundwater basin or subbasin specified in the petition.

Active Management Areas

The magnitude of the overdraft in certain areas of the state led to the designation of four initial AMAs, the Phoenix, Tucson, Pinal and Prescott AMAs, with a fifth AMA, the Santa Cruz AMA, established from a portion of the Tucson AMA in 1994. Groundwater overdraft in these AMAs was more severe than in other parts of the state and as such the management structure is more intensive. While certain aspects of the statewide provisions are also enforced in the AMAs, including surface water rights administration, other aspects are significantly enhanced to address the continued overdraft in these areas.

Below is a brief description of the management structure in the AMAs that regulate or reduce groundwater use, programs that facilitate the use of renewable water supplies, and programs that regulate water supplies for new subdivisions. The underpinning of the management structure is the statutory management goal enacted in the 1980 Code for each AMA. The Phoenix, Prescott and Tucson AMAs are directed to achieve safe-yield by 2025. Safe-yield is defined as a long-term balance between the amount of groundwater withdrawn in an AMA and the amount of water naturally recharged to the aquifer, through either rainfall or runoff percolating into the aquifer, or artificially through recharge projects. The management goal of the Pinal AMA calls for allowing the area's predominantly agricultural economy to continue for as long as feasible, while also allowing for the development of non-irrigation uses by the municipal and industrial water use sectors. The management goal of the Santa Cruz AMA is to maintain a safe-yield condition and prevent local water tables from experiencing long-term declines (A.R.S. 45-562).

To achieve these goals the drafters of the Code identified the need to rely on a structure of groundwater rights and authorities to better manage the resource. Groundwater cannot be withdrawn in an AMA unless a grandfathered right is in place or the user has obtained a groundwater withdrawal authority.

Irrigation Grandfathered Rights

Within AMAs, anyone who owns land that was legally irrigated with groundwater at any time from January 1, 1975 to January 1, 1980 and has been issued a Certificate of Irrigation Grandfathered Right (IGFR) by the ADWR has the right to use groundwater for the irrigation of that land. The term irrigation is limited to the growing of crops for sale, human consumption or livestock feeding on two or more acres. IGFRs are regulated through the Agricultural Conservation Program.

Type 1 and Type 2 Non-Irrigation Grandfathered Rights

A Type 1 non-irrigation grandfathered right is associated with land permanently retired from farming and converted to a non-irrigation use. This right, like an irrigation grandfathered right, may be sold or leased 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 pursuant to a Type 2 non-irrigation grandfathered right can generally be used for any non-irrigation purpose. The right is based on historical pumping of groundwater for a non-irrigation use from a non-exempt well (pumping capacity of greater than 35 gallons per minute) and equals the maximum amount pumped in any one year between 1975 and 1980. Type 2 rights can be sold separately from the land or well.

These rights are most often used for industrial purposes such as sand and gravel facilities, golf courses and dairies. Type 1 and Type 2 right holders are generally required to follow the conservation requirements associated with the Industrial Conservation Programs.

Service Area Rights

Service area rights allow cities, towns, private water companies and irrigation districts to withdraw and transport groundwater to serve their customers. Most persons within an AMA receive water through service area rights. Entities with service area rights regulated under the Municipal Conservation Program.

Groundwater Withdrawal Permits

Groundwater withdrawal permits allow new withdrawals of groundwater for non-irrigation uses. Currently, seven types of withdrawal permits are allowed under the Code. A General Industrial Use Permit (GIU), the most commonly used type of permit, allows the withdrawal of groundwater for industrial uses outside the service area of a city, town or private water company. Generally, users of these permits are required to participate in the Industrial Conservation Program.

Wells

Two types of applications for well drilling authority exist:

A Notice of Intention (NOI) to Drill is required to be filed with ADWR for all wells which are to be drilled outside the AMAs and exempt wells which will be located inside an AMA. Filing a NOI automatically registers a well.

Application for a Drilling Permit is required for non-exempt wells that will be drilled within an AMA.

Water Measurement and Reporting Requirements

Groundwater withdrawn from non-exempt wells must be measured using an approved measuring device or method. In addition, all groundwater withdrawn from non-exempt wells is subjected to an annual groundwater withdrawal fee. Fees collected for augmentation, conservation assistance, and monitoring and assessing water availability are used to finance the augmentation and conservation assistance programs that are part of the Management Plans for AMAs, plus funding the Arizona Water Banking Authority (AWBA).

Annual water withdrawal and use reports are required to be filed for most groundwater withdrawn within an AMA. Accurate records of the right holder's withdrawals, transportation, delivery and use of groundwater must be kept by the right holder and reported to ADWR on a yearly basis.

Management Plan Requirements (Conservation Requirements)

Each AMA must develop a management plan for each of the following periods:

First Management Period (FMP)	1980 – 1990
Second management Period (SMP)	1990 – 2000
Third Management Period (TMP)	2000 – 2010
Fourth Management Period (4MP)	2010 – 2020
Fifth Management Period (5MP)	2020 - 2025

The management Plans contain the efficiency requirements for withdrawing groundwater from a non-exempt well and require participation in one of the following: the Agricultural Conservation Program, the Municipal Conservation Program or the Industrial Conservation Program.

Agricultural Conservation Program

Holders of irrigation grandfathered rights who withdraw water from a non-exempt well are subject to the Agricultural Conservation Program, which determines conservation requirements based on water duties and maximum annual groundwater allotments.

Municipal Conservation Program

Under the Municipal Conservation Program, municipal water providers are required to meet conservation requirements based on reductions in total per

capita use or to implement specific conservation measures designed to reduce per capita use in their service areas. Additionally, municipal providers are required to limit the amount of lost and unaccounted for water in their delivery system.

Industrial Conservation Program

All Type 1 and Type 2 Non-Irrigation Right holders and some groundwater withdrawal permit holders are subject to the Industrial Conservation Program, which determines conservation requirements based on the best available technology for the end use and range, based on the permit or right type, from best management practices (BMP) to specific groundwater allotments for water users such as turf-facilities.

Compliance and Enforcement Program

ADWR developed a compliance and enforcement program to ensure that conservation requirements are met. The annual water withdrawal and use reports previously mentioned are one part of this program. Additionally, audits are conducted to determine if water users are in compliance with conservation requirements. If a water user is found to be out of compliance, ADWR sends out a notice of non-compliance, conducts post audit meetings with the water user, and attempts to negotiate a settlement for the excess water used.

Conservation and Augmentation Assistance Programs

The SMP was modified in 1991 to include a program for conservation assistance to water users within an AMA. The goal of the Conservation Assistance Program is to assist water users in achieving the Management Plan requirements, leading ultimately to a realization of the management goal of the AMA.

The SMP and TMP also include an Augmentation Assistance Program designed to supply augmentation grants for construction and pilot recharge projects designed to directly increase water supplies or water storage, conservation assistance, and planning, research and feasibility studies.

The Conservation Assistance and Augmentation Assistance Program grants are funded by groundwater withdrawal fees collected from those who pump groundwater in each AMA.

Assured Water Supply Program

Arizona's Assured Water Supply Program is designed to sustain the State's economic health by preserving groundwater resources and promoting long-term water supply planning. This is accomplished through regulations that mandate the demonstration of renewable water supplies for new subdivisions. The program is an integral component of Arizona's 1980 Groundwater Code, which

was designed to address severe groundwater level decline rates in major urban and agricultural areas.

History

In 1973, the Arizona Legislature enacted a statewide water adequacy statute as a consumer protection measure (A.R.S. § 45-108). The law was passed in response to incidences of land fraud involving the sale of subdivision lots that were later found to have insufficient water supplies. This law required developers to obtain a determination from the State regarding the availability of water supplies prior to marketing new subdivision lots. Developers were then required to disclose any "inadequacy" of the supply to potential lot buyers. The adequacy program is still in effect today out side of the AMAs.

The 1980 Groundwater Code contains more rigorous provisions for new subdivisions in the AMAs. The 1980 Code prohibits the sale or lease of subdivided land in an AMA without demonstration of a 100-year assured water supply. An assured water supply determination is required to gain approval of a subdivision plat by local governments, and to obtain authorization to sell lots by the Department of Real Estate. A subdivision is defined as land divided into six or more parcels where at least one parcel is less than 36 acres. Land divisions resulting in parcels larger than 36 acres are classified as "unsubdivided" lands and do not require an assured water supply determination.

1995 Assured Water Supply Rules

In 1991, the Arizona Department of Water Resources (ADWR) began developing formal administrative rules for meeting the statutory criteria. The effort, which involved considerable public input, culminated in the adoption of the Assured Water Supply (AWS) Rules in February 1995. The two most common types of documentation for an AWS are a Certificate of Assured Water Supply (Certificate of AWS) and a Designation of Assured Water Supply (Designation of AWS).

New subdivisions are required by the 1980 Groundwater Code to have a Certificate of AWS, unless a water provider designated as having an assured water supply serves them. The Certificate of AWS states that the developer has proven that sufficient water supplies exist for the subdivision for 100 years. If the new subdivision or development is within the service area of a Designated Water Provider, then a Certificate of AWS is not required; provided that the developer has obtained a written commitment of service from a water provider designated as having an assured water supply. As a example, if a subdivision is being built in the Tucson AMA within the City of Tucson's service area, the developer only needs to provide written proof to ADWR of the City of Tucson's commitment of service to meet the AWS requirements, since the City of Tucson has already met the AWS criteria and obtained a Designation of AWS.

For municipal private water providers, a Designation of AWS is issued. This Designation of AWS states that the municipality or private water provider has

proven sufficient water supplies to service their current, committed and future demand for 100 years. Municipalities and private water providers are not required to apply for a Designation of AWS, but there are incentives to do so. A Designated Water Provider can deliver water to new developments within their service area, without the new subdivision having to apply for their own Certificate of AWS. The most populous cities within AMAs have obtained a Designation of AWS, and thus a majority of new subdivisions qualify through this process.

Assured Water Supply Criteria

To obtain an assured water supply determination, the statute requires a demonstration of:

1. Physical, legal and continuous water availability for 100 years;
2. Water quality standards attainment;
3. Financial capability to construct the delivery system and related features;
4. Consistency with the AMA's management plan; and
5. Consistency with the AMA's management goal.

Meeting the Assured Water Supply Criteria

Developers seeking a Certificate of AWS must demonstrate that sufficient qualifying water supplies are available to meet subdivision demands for at least 100 years. Water providers seeking a Designation of AWS must demonstrate that sufficient qualifying supplies are available to meet current demand, committed demand (i.e. that which is associated with recorded, (undeveloped lots) and at least two years of projected growth for a 100 year period.

Accounting, Reporting and Monitoring

A credit account is maintained by ADWR for each Certificate and Designation of AWS. The account is updated annually based on reports filed by water providers. ADWR will review the AWS status of designated water providers periodically to determine whether the designation remains valid.

Underground Storage and Recovery Program

In 1986, the Arizona legislature established the Underground Water Storage and Recovery Program to allow storage of renewable water underground and to recover it at a later time for the storer's use. Between 1986 and 1993, the legislature added several other programs related to underground water storage. In 1994, the Arizona legislature consolidated these various underground water storage programs into a unified program by enacting the Underground Water Storage, Savings, and Replenishment Act (UWS).

The UWS program is administered by the Arizona Department of Water Resources (ADWR). The UWS program has two sets of goals. The first set of goals is to encourage the use of renewable water supplies to satisfy existing needs, to allow for effective and flexible storage of renewable water supplies not currently needed, and to preserve non-renewable groundwater supplies. The second set of goals for the UWS program is to allow for the efficient and cost

effective management of water supplies by allowing the use of underground storage facilities for filtration and distribution of surface water rather than constructing surface water treatment plants and distribution systems. This UWS program goal allows storage of water in one location and recovery in a different location. Therefore, water may be stored near its source and recovered where it is needed. Although the UWS program contains some restrictions to this "transportation," the program may be used to deliver water to where it is needed without the expense of constructing canals and pipelines.

Recharge Methods

There are various methods to recharge water. The UWS program recognizes two general categories of recharge facilities. These are Groundwater Savings Facilities (GSF) and Underground Storage Facilities (USF). At GSFs, also called "in-lieu" recharge projects, an entity with an excess supply of renewable water (such as a municipal water provider) delivers this water to a facility that would otherwise have pumped groundwater (such as a farm). The recipient then uses the renewable water in lieu of pumping groundwater. The supplier of the renewable water then earns credits to "recover" this renewable water at a later date from anywhere within the Active Management Area (AMA) that meet the requirements set forth in the ADWR Management Plans. The potential for increasing the number of GSF projects is limited by the loss of agricultural land in the AMAs. As agricultural land is taken out of production due to urbanization or other factors, the acreage available for this type of project will decrease.

At USF projects water is physically added to an aquifer by a number of different means. The most commonly used methods are identified below (modified from Table 4 of Regional Recharge Committee Technical Report).

1. Off-Channel Constructed Shallow Spreading Basins: Designed to be operated in a wet-dry cyclic mode to maintain high infiltration rates. The dry cycle is used to control the development of a biological film at the surface that impedes the movement of water. The water depth during the wet cycle is not more than five feet.
2. In-Channel Constructed Facilities: Facility functions within the active floodplain of a watercourse. May include use of inflatable dams, gated structures, levees and basins, compound channels, etc.
3. Managed In-channel Recharge: Facility involves no construction (other than monitoring devices). The natural stream channel is used for "passive" recharge.
4. Injection Wells: Wells used to inject water directly into the water-bearing unit of the aquifer. Generally requires source water that meets drinking water quality standards. Best and most direct method of limiting subsidence since the water is recharged directly to the aquifer.
5. Induced Recharge: Use of extraction wells alongside a river channel to draw down groundwater levels, thereby preventing the water table from intercepting the land surface and sustaining favorable infiltration rates. This method is only

applicable in areas where the permeability and transmissivity of subsurface soils are favorable.

6. **Vadose Zone Recharge Wells:** Wells introduce water into permeable, unsaturated strata above the water table. Wells differ in design and construction from stormwater drywells, which are commonly used to drain urban runoff into the vadose zone to comply with local detention/retention ordinances. (Note: the vadose zone is the layer of unsaturated soils that usually extends from the land surface to the top of the uppermost aquifer.)
7. **Deep Basins or Pits:** Recharge pits differ from drywells in size and shape; unlike wells, they are typically much wider than they are deep. Pits are constructed to expose coarse-grained sediments of the vadose zone when fine grained overburden precludes the use of shallow spreading basins.

Recovery

The holders of long term storage credits, either the entities that stored the water or the purchasers of the resulting credits, may recover (i.e. pump) a volume of groundwater in most cases equal to the accrued credits. This pumped water legally retains the character of the stored water. That is, if CAP water is stored at a facility and long term storage credits are earned for that CAP water storage, then a volume of groundwater equal to that volume of credits may be pumped. However, this groundwater is considered to be CAP water for the purposes of the conservation requirements of the Groundwater Code.