

Arizona Water Legisla

Arizona's Adequate Water Supply Program: Is It Adequate for Rural Areas?

Jim Davis – Errol L. Montgomery and Associates

In 1973, the Arizona Legislature enacted the Adequate Water Supply Program, a law requiring land developers to obtain a statement of water adequacy from the Arizona Water Commission, predecessor of the Arizona Department of Water Resources (ADWR), prior to recording a subdivision plat. The law was passed in response to numerous land fraud incidents in which developers were selling land with little or no water supply to unsuspecting buyers. The law was not intended as a groundwater management tool, nor did it prevent the sale of land with insufficient or no water supply. It merely required that the adequacy or inadequacy of the water supply be disclosed to potential buyers.

An adequate water supply is defined as a sufficient quantity of suitable-quality water that is physically, legally, and continuously available for 100 years to satisfy the water demands of the proposed subdivision.

A principal limitation of the Adequate Water Supply

Program is that, because it fails to limit groundwater use or require replenishment, a finding of an adequate water supply for a subdivision could become moot if subsequent development or industry were

to cause impacts to groundwater quantity or quality that were unanticipated in the original adequacy finding. In much

Increasing water demand is placing many rural areas into groundwater overdraft.

of rural Arizona, the Adequate Water Supply Program remains in effect.

AMAs Established

In 1980, the Arizona Legislature enacted the Groundwater Management Act (GMA) to conserve and manage groundwater

resources in areas of the state where groundwater overdraft and associated legal conflicts were most prevalent at the time. These areas were legally termed Active Management Areas (AMAs) and include most of the state's largest urban and agricultural centers (see map).

With passage of the GMA, the Adequate Water Supply Program within AMAs was replaced by

the Assured Water Supply Program. The definition of a water supply as "assured" is similar to that of an "adequate" supply, but the allowable future depth to water is

see Adequate, page 30

Demonstrating An Adequate Groundwater Supply

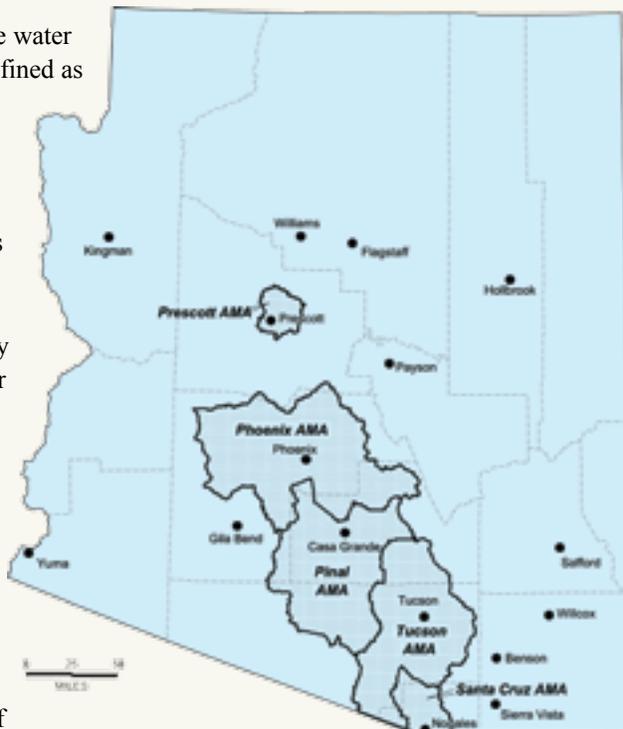
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According to ADWR, demonstrating an adequate groundwater supply includes: 1) estimating water demand; 2) evaluating groundwater (aquifer) characteristics; 3) documenting groundwater quality; and 4) quantifying the effect on groundwater levels from pumping to meet water demand. Continuous groundwater availability must be demonstrated for 100 years after full build-out of the proposed development.

The simplest method of demonstrating groundwater availability is the "tank analogy." The volume of groundwater in storage below the subdivision or water company franchise area is calculated by multiplying the surface area by the saturated thickness of the aquifer above a depth of 1,200 feet to obtain a volume of saturated sediment, which is then multiplied by specific yield. This method does not account for groundwater inflow, thus it underestimates the available supply.

A more realistic approach is to use an analytical solution such as the Theis equation. Drawdown in the aquifer is computed as a function of pumping rate, aquifer properties, and the location of aquifer boundaries. This is the most common method used, but unlike the tank analogy, it requires determination of aquifer transmissivity from pumping tests.

If sufficient data are available, the most realistic method is numerical modeling, typically utilizing the USGS MODFLOW model. Such models can explicitly represent non-homogeneous aquifer hydraulic properties and boundaries, natural and artificial recharge, and other groundwater withdrawals, and can be calibrated on historic water level data. Although costly and time-intensive, numerical modeling is commonly employed for large developments with high water demand or when numerous users are competing for limited groundwater supplies.



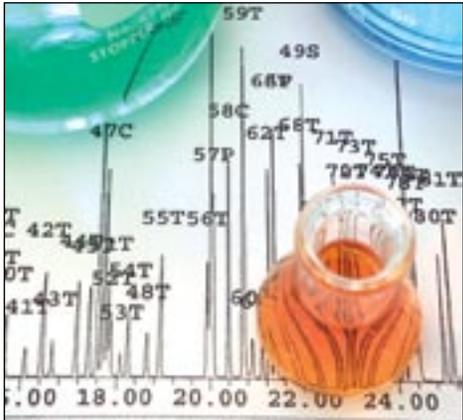
Location of Active Management Areas in Arizona.

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generally shallower than the 1,200-foot depth required for the “adequate” category. The methods used to demonstrate the physical availability of an “adequate” or “assured” water supply are essentially the same (see sidebar, page 20).

Adequate Versus Assured

Several important administrative and legal differences distinguish the “adequate” and “assured” water supply programs, the most notable being that if a subdivider inside an AMA fails to demonstrate an assured water supply to ADWR, the Department of Real Estate cannot approve the subdivision for sale, and the county cannot record the plat, thereby preventing the developer from selling lots. Conversely, in the more rural parts of Arizona outside the AMAs, a subdivider who fails to demonstrate an adequate water supply (or who chooses not to demonstrate it) merely receives a report of an “inadequate” water supply from ADWR. The Department of Real Estate must approve the subdivision for sale but is required to disclose the “inadequate” water supply finding in the public report for the subdivision. However, the subdivider is not prevented from selling subdivision lots.

In passing the GMA, the Arizona Legislature focused on areas of the state that were experiencing the most serious groundwater overdraft problems at the time. It specifically excluded areas outside the AMAs because those areas were neither growing rapidly nor expected to have imminent groundwater availability concerns. However, since passage of the GMA, many formerly “rural” areas outside of the AMAs have experienced very rapid growth, and many others are anticipated to experience such growth in the near future. As a result, increasing groundwater demand is placing several areas outside of AMAs in a condition of groundwater overdraft, where the rate of groundwater withdrawal substantially exceeds the rate of recharge, causing groundwater levels to decline.

Feeling the Squeeze

Areas experiencing rapid growth, such as the upper San Pedro, Willcox, and

Douglas basins in Cochise County, are presently experiencing groundwater overdraft, a condition that can be expected to worsen as growth continues. Planned developments in the Hualapai groundwater basin north of Kingman would more than double the population of Mohave County, and are competing with each other for available groundwater supplies. In the Tonto basin of north-central Arizona, the communities of Payson, Pine, and Strawberry are experiencing water shortages due to limited aquifer storage combined with increasing pumpage by groundwater users. On the Coconino Plateau, cities such as Flagstaff, Williams, Ash Fork, and Seligman are dealing not only with limited aquifer storage capacity and increasing demand, but with groundwater levels 1,000 to 2,000 feet or more below land surface.

Cities inside AMAs generally have access to three different sources of water: surface water (including Central Arizona Project water), groundwater, and treated wastewater effluent, while communities outside AMAs usually rely on groundwater as their sole source of supply. In much of rural Arizona, no alternative water supplies are available, no large-scale water conservation programs are in place, and very little effluent is reused, as is commonplace in the AMAs.

The lack of alternative water supplies and management of groundwater supplies in these developing areas, combined with rapid growth, is expected to result in excessive groundwater overdraft, legal conflicts, and water shortages, similar to those the AMAs were facing prior to enactment of the GMA. In response to this situation, many water officials feel implementation of effective groundwater management in these developing areas may be even more urgent than that implemented for the AMAs in 1980.

Policy Change Needed

Many municipal water providers in Arizona, along with state and local government officials, have recommended changes in the Adequate Water Supply Program that would require demonstration