

## **How Does the CAP Water Bank Influence Short-Term and Long-Term Water Supply Vulnerability in the Basin?**

**by**

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Arizona is banking a portion of its Colorado River allocation by diverting the water not needed for direct use and storing that water underground through a variety of recharge facilities. This action is a major part of the state's water management strategy. Banking of short-term excess water supplies to use in times of shortage is good water management. Everybody should do it.

The water supply for Banking is part of the Lower Basin annual entitlement of 7.5 million acre-feet (maf). While CAP Banking does lower Lake Mead, it does not change the release requirement from Lake Powell or take water away from any Upper Basin reservoirs such as Granby, Dillon, Blue Mesa or Flaming Gorge.

It is being accomplished through the collaborative efforts of the Central Arizona Project (CAP) and the Arizona Water Banking Authority (AWBA), a state agency created specifically to facilitate underground storage of any Colorado River water not needed for direct use in any year.

Banking is necessary because of CAP's junior priority on the Lower Colorado River. It is the CAP water supply that will be most reduced when a shortage is declared. Banking water will provide a substitute water supply for CAP municipal and industrial customers when their supply is reduced in times of shortage.

As a basis for understanding Arizona's Banking program, I will provide some background about the AWBA and the evolution of Arizona's recharge programs. In 1980, Arizona adopted a Groundwater Management Act (GMA) which established, arguably, the most comprehensive program of groundwater ownership, regulation and use management in the United States. The Active Management Areas (AMAs) primarily covered the CAP service area, Arizona's most populous area. In 1986, the legislature passed the first underground storage (recharge) statutes that allowed Colorado River water, effluent and other water to be stored underground within the AMAs and regulated as stored water not ground water. For the next 5 or 10 years, CAP was almost the only entity actively engaged in recharge. CAP accumulated about 800,000 af of underground storage credits through 1996.

In about 1990, a state demonstration project act provided for the CAP to assess a \$.04 property tax in its most populous counties (the Phoenix and Tucson areas) and put those dollars in a fund to be used to build underground storage projects or to purchase water to

be stored. The Arizona Department of Water Resources (ADWR) provided oversight of the funds.

In 1996, the legislature established the AWBA – a small but separate entity. The AWBA has five directors: the chairman is the Director of Arizona Department of Water Resources, one director is the CAP Board President, one is a representative of CAP municipal water subcontractors, one is a representative of a junior priority municipal provider along the river, and one is a governor appointee with water resource management knowledge. The ADWR provides administrative, technical and legal support. The CAP is the operating arm and also provides water accounting and technical support. The AWBA funding is provided by a CAP collected \$.04 property tax over the entire CAP service area, a groundwater property tax collected in the three CAP AMAs and, as available, general fund appropriations.

The primary purpose of the AWBA is to store Arizona's unused Colorado River entitlement by using the CAP facilities to divert that water for underground storage in central and southern Arizona. The stored water provided long-term storage credits to be used to firm the M&I supplies for CAP M&I subcontractors and certain M&I providers along the Colorado River. The AWBA may also store water to meet the GMA objectives or, potentially, to assist in settlement of Indian water rights claims. The source of funds and the use of water are strategically linked. Additionally, the AWBA is authorized to engage in Interstate Banking and exchange. An active program is in place with the Southern Nevada Water Authority (SNWA).

With that background, the focus can be shifted back to the influence of Arizona Banking activities on the availability of the Colorado River water supply. Whose supply is impacted and in what manner?

As previously stated, Banking by the CAP does reduce the total water stored in the Colorado River storage system. Specifically, it lowers the storage in Lake Mead. But, the water used for Banking is a part of Arizona's normal water supply entitlement, the unused entitlement of other Lower Basin States (primarily Nevada) or any declared surplus apportioned to Arizona. The CAP fully understands that as a politically imposed condition of CAP authorization, the CAP water supply is junior to California and is the junior water right within Arizona. When a shortage is declared, CAP will take the greatest reduction. In the short-term (the next 15 to 20 years), any reasonably expected shortage amount is not likely to require CAP to recover the long-term storage credits to meet M&I demands in central Arizona. CAP water supply reductions will be assessed first to Banking, then recharge by other entities, short-term annual users and CAP agricultural priority water users. The higher CAP priorities of M&I and Indian users are not likely to be impacted in the short-term.

CAP does expect to begin recovery of water stored for SNWA as early as 2007 to firm up water supplies for southern Nevada while other non-Colorado River water supplies are being developed by SNWA.

In the short-term, CAP Banking does increase the possibility of reduced supplies for CAP agricultural users, recharge in Arizona and certain M&I users along the river and southern Nevada. However, the banked supplies will be available to restore the water supply to M&I users along the river and in southern Nevada.

In the long-term, CAP expects to continue Banking in normal years until the full Arizona Colorado River entitlement is needed for direct use each year. That is probably 20 to 30 years away. We expect to continue Banking during years of surplus supply for even longer – 50 years or more. The CAP authorization, the CAP contracts and the GMA all provide that CAP agricultural priority users will receive a reduced supply in times of a declared shortage of Colorado River supply. The banked water supply will be used to firm up the junior M&I water supplies in Arizona. In the long-term, CAP Banking improves the reliability of the CAP supply and virtually eliminates the vulnerability of Arizona’s Colorado River M&I supplies to shortages of the Colorado River water supply.

The Arizona Water Banking program has grown into an active and successful program. As shown on *Figure 1*, a grand total of almost 3.4 maf has been stored in the 1997 through 2004 period. About 2.3 maf has been stored by the AWBA, which includes about 120,000 af for SNWA. At this time, the AWBA goal is about 4.6 maf, with 3.4 maf for M&I firming and 1.2 maf for interstate purposes. In total we are nearing 50 percent of our goal for a 100-year firming supply in only 8 years of Banking.

Figure 1

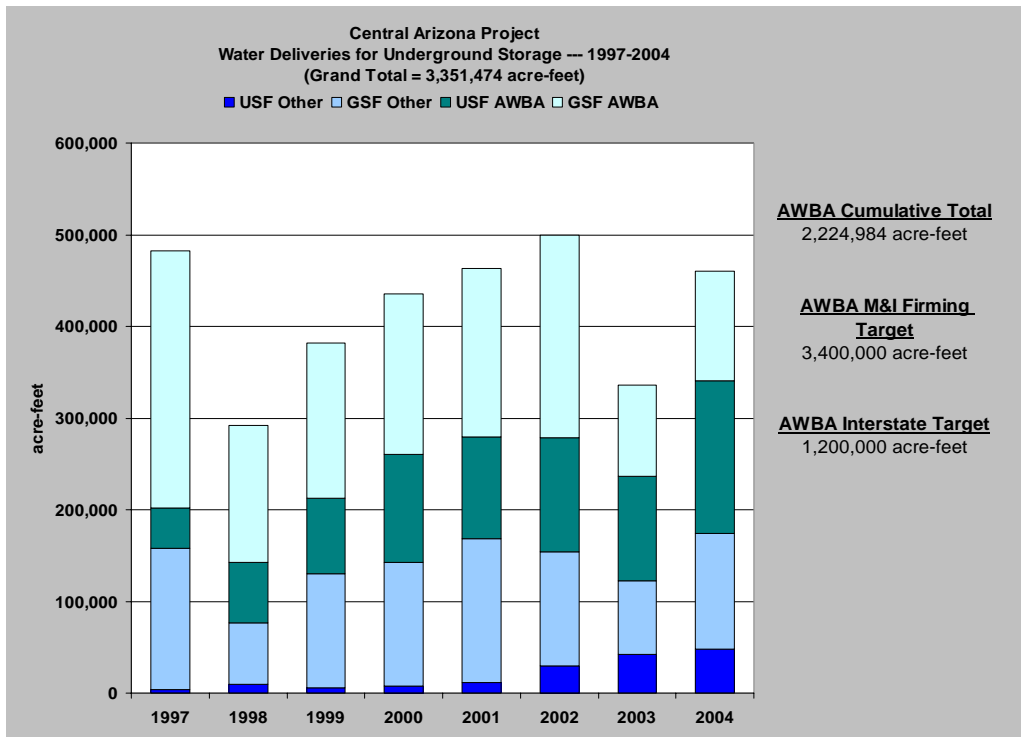



Figure 2 shows that currently existing direct recharge facilities (underground storage facilities) have a permitted capacity of 496,000 af per year. Facilities to provide an additional capacity of 390,000 af per year are in various stages of construction or planning. The annual permitted capacity of groundwater savings facilities is over 700,000 af per year. These are financial arrangements with irrigation districts that would normally pump lower cost groundwater to encourage them to use CAP water at a subsidized cost in lieu of groundwater. The financial partner that “buys down” the cost of CAP water earns long-term underground storage credits. The AWBA is not the only user of the listed storage facilities. Most of the facilities are not used to full capacity each year because of operational constraints of the CAP, lack of water supply or lack of sufficient funds to purchase water.

Figure 2

|  <b>CENTRAL ARIZONA PROJECT</b><br><b>CAP Water for AWBA Underground Storage</b><br><b>Underground Storage (USF) and Groundwater Savings (GSF) Facilities</b> |                         |                                |                      |
|--|-------------------------|--------------------------------|----------------------|
| Underground Storage Sites:   | Permitted Capacity (AF) | AWBA Used Capacity (2004) (AF) | Future Capacity (AF) |
| <b>PHOENIX A.M.A.:</b>   |                         |                                |                      |
| USF > GRUSP  | 200,000                 | 56,500                         |                      |
| HIEROGLYPHIC   | 35,000                  | 21,400                         |                      |
| AGUA FRIA  | 100,000                 | 16,300                         |                      |
| TONOPAH  |                         |                                | 150,000              |
| NAUSP  |                         |                                | 90,000               |
| SUPERSTITION   |                         |                                | 90,000               |
| GSF > CHCID  | 3,000                   | 570                            |                      |
| MWD  | 18,000                  | 0                              |                      |
| NEW MAGMA  | 54,000                  | 46,100                         |                      |
| QUEEN CREEK  | 28,000                  | 7,500                          |                      |
| RWCD   | 100,000                 | 0                              |                      |
| SRP  | 200,000                 | 8,000                          |                      |
| TONOPAH ID   | 15,000                  | 2,500                          |                      |
| <b>PINAL A.M.A.:</b>   |                         |                                |                      |
| USF > CAIDD  | 110,000                 | 13,800                         |                      |
| GSF > HOHOIKAM   | 55,000                  | 16,700                         |                      |
| MSIDD  | 120,000                 | 23,000                         |                      |
| <b>TUCSON A.M.A.:</b>  |                         |                                |                      |
| USF > AVRA VALLEY  | 11,000                  | 5,800                          |                      |
| PIMA MINE RD   | 30,000                  | 17,100                         |                      |
| LOWER SANTA CRUZ   | 40,000                  | 37,900                         |                      |
| CLEARWATER   | 80,000                  | 6,000                          |                      |
| SAYSARP  |                         |                                | 60,000               |
| GSF > BKW FARMS  | 9,000                   | 0                              |                      |
| Cortaro Marana   | 10,000                  | 0                              |                      |
| Kai FARMS (Red Rock)   | 11,000                  | 1,100                          |                      |
| <b>TOTAL USF</b>   | <b>496,000</b>          | <b>161,000</b>                 | <b>390,000</b>       |
| <b>TOTAL GSF</b>   | <b>733,000</b>          | <b>119,270</b>                 |                      |
| <b>GRAND TOTAL (USF +GSF)</b>  | <b>1,229,000</b>        | <b>280,270</b>                 | <b>390,000</b>       |

Prepared: May 27, 2005

Figure 3 is a photo of one of the larger underground storage facilities, the Agua Fria Recharge Project. It is located northwest of Phoenix in the flood plan of the Agua Fria River about four miles below the location where the CAP aqueduct crosses the river channel. It consists of 4 miles of in stream channel recharge, a diversion facility and about 100 acres of infiltration basins. Its normal expected use is 20,000 to 60,000 af per year.

Figure 3



The CAP and other Arizona entities have invested tens of millions of dollars in recharge facilities. We are assessing ourselves several million dollars each year to purchase and store available water supplies. We plan for Banking to be a major part of our reliable water supply.

It has been suggested by some in the Upper Basin that CAP should not be storing water underground in consideration of the low reservoir levels and the recent (ongoing?) drought conditions. It is good water management to store excess water when available to use when supplies are short. Arizona and the CAP are not the only entities storing Colorado River water underground. California and Nevada also do underground Banking. California and Arizona also have significant off stream surface storage in our Colorado River delivery systems. Although these reservoirs are mostly for short-term and regulatory storage, we do refill them regularly. The Upper Basin States store excess water, when available, in surface reservoirs above Lake Powell in order to help meet dry-year needs. If you have the capability to do it, underground storage is a valuable component of water management.

Banking is Arizona's way of protecting against the CAP junior priority status. It is not a new supply for future growth. It provides for firming our Colorado River M&I allocations to a reliable supply.

The Colorado River is over-allocated and will someday be over-developed. In the legislative debates about authorizing the CAP, the promised answer for over-allocation was augmentation. In the 1970's and 1980's the Bureau of Reclamation worked diligently on augmentation studies. One of the most promising proposals was weather

modification in the form of cloud seeding to enhance snow pack. The 1981 report on CREST, the Colorado River Enhanced Snow Pack Test, identified a program that was ready to go. It was supported by all Seven Basin States. The power users who would receive the benefits of the additional power produced would pay for it. The benefit/cost ratio was estimated to be in the 7-to-1 to 10-to-1 range. So why didn't we do it? It got wet. We experienced the 1983-1985 flood flows. By the early 1990's it was dry again. The CREST report was updated and released in 1993. The Colorado River again was in the flood mode. If updating the report again will bring surplus again, then update the report. If that doesn't work, let's implement CREST.

It is time to quit fighting about how we manage a short supply and work together to increase the supply.