

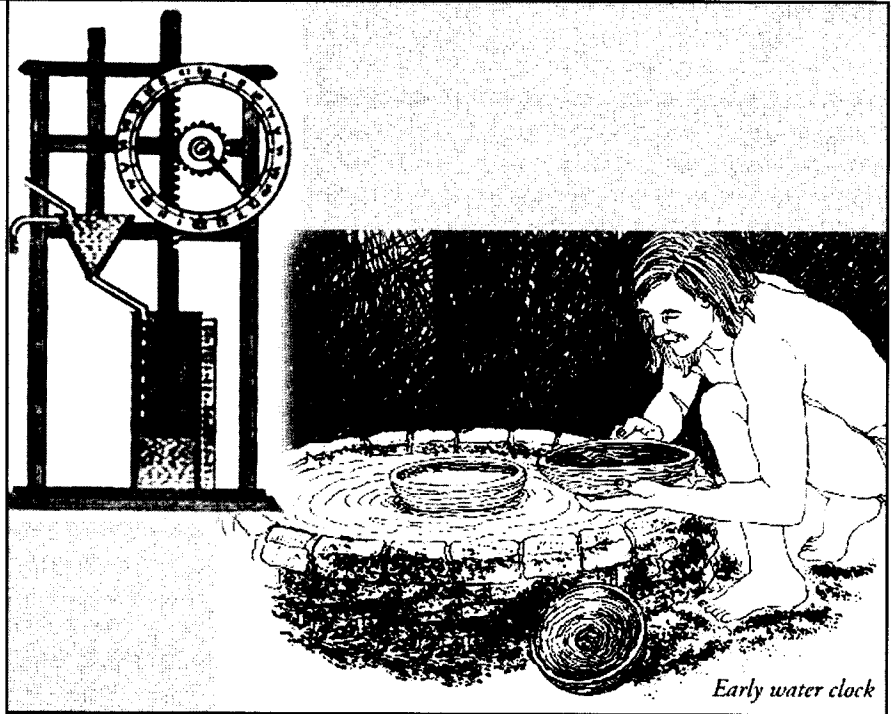


Water Clocks Drip Out The Old Year

Water and time, a suitable note to sound for this end-of-the-year edition of the Arizona Water Resource newsletter, are separate and distinct, yet at some level water and time strike a common chord. For example, rivers often represent the passing of time, with both water and time flowing relentlessly onward. In at least one particular instance, however, the association of water and time is more direct: water clocks.

Water clocks were among the earliest timekeepers not relying on the tracking of celestial bodies. An early bowl-shaped version is seen at right. The bowl when placed in a container of water slowly fills at a constant rate from a hole in the bottom of the vessel. Markings on the inside surface measured the passage of "hours" as the water level reached them. These clocks were handy to determine hours in the dark of night but may also have been used in daytime.

Also shown is a more sophisticated water clock designed in 245 BC by Ctesibius, a Roman living in Alexandria. Water drips at a constant rate from the higher container to the lower container. The rising water level in the lower container causes a float, which is attached to a notched stick, to rise. As the stick rises, the notches turn a gear that moves the hand to point to the time.



Early water clock

Arizona, Nevada Are Partners in Major Water Banking Deal

Nevada gets water; Arizona gets funds, political ally

by Joe Gelt

The Arizona Water Banking Authority was established in 1996 in response to growing concerns about Arizona's Colorado River allocation. At the time, California was using far more than its allocated 4.4 million acre feet of Colorado River water, and Nevada's need for additional water resources was becoming increasingly acute. Meanwhile Arizona was not using its full 2.8 million acre-foot allocation.

Arizona appeared not to be water needy, and officials feared the state's allocation of Colorado River water could be at risk. The AWBA was a strategy to enable the state to take possession of its allocation and ensure the reliability of future supplies. Central Arizona Project water would be "banked" or, in other words, recharged to help ensure secure, dependable long-term water supplies for the state. Accomplishing this was especially important considering CAP's low priority Colorado River allocation.

If the bank had not been available to store water, Arizona might not have used its full Colorado River allocation as early as it did, and the state would have left significant quantities of water in the river. The water bank is doing what banks are supposed to do: save and protect a resource for future use. The AWBA is also authorized to bank on behalf of Nevada and California if water is available.

The AWBA has less water to store and less funding than was originally projected and is involved in negotiating with Nevada an amendment to a 2001 interstate water

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banking agreement. The amendment has broad water supply and political implications. Examining the issues involved in the negotiations shows the AWBA taking advantage of changing circumstances to better cope with water shortages and budget deficiencies while encouraging a new spirit of interstate cooperation.

Another view is that Arizona is bowing to political pressure from Nevada to store water on its behalf. If Arizona did not go along with the amendment, some speculate that Nevada might try to negotiate with the Colorado River Indian Tribes to fallow farmlands and free up water supplies to move from Arizona to Nevada. Although this would run afoul of present laws, Nevada might stand a good chance of having Congress change the law. Arizona would prefer that the Law of the River remain intact.

Some believe that the federal government, although not taking direct sides, wants Arizona to accept an amended agreement. Speaking at the recent Arizona Town Hall, Bennett Raley, assistant secretary for water and science, U.S. Department of Interior, commented on the importance of Arizona assisting Nevada build a bridge to secure long-term water supplies.

Changing Circumstances

When the AWBA was established, projections were made about the amount of CAP water available for storage and the likely occurrence of shortages, two prime considerations in the operation of the bank. Drought has called into question some of the original projections. Shortages now seem more likely and more frequent than anticipated, and less CAP water may be available for banking, with the result that the demand for bank storage may be higher than was projected.

Not only have natural conditions limited the AWBA's ability to store water, but bank operations have been set back by a loss of funding. The Arizona Legislature has dipped into the AWBA budget as a source of funds to make up for budget shortfalls in other areas of state government. Also, the Arizona Department of Water Resources has been forced to use AWBA funds to support agency activities due to funding cutbacks. The result has been less AWBA funds available for storing water.

This leaves the AWBA in a difficult position. With the daunting prospect that less water will be available in the future due to high demand and lower than expected inflow, the AWBA might be expected to maximize storage while water supplies are still available. A shortage situation now exists but no cut backs in water deliveries have yet occurred because of substantial storage in the river system. The AWBA, however, does not have the funds to bank the additional water in the face of future shortages. The available but unbanked water represents a lost opportunity.

Correction

The September - October AWR incorrectly quoted Dr. Paul Krausman about the effectiveness of water catchments for wildlife in the desert. He was not in fact being critical of their effectiveness; instead he stated that the importance of catchments to wildlife is a controversial issue. AWR regrets the error.

Nevada Seeks an Amendment

In July 2001 an agreement was worked out between the AWBA and the Southern Nevada Water Authority and the Colorado River Commission of Nevada. Per the agreement, AWBA promised its "best effort" to store sufficient supplies of Colorado River water to enable Nevada to pay for and earn 1.25 million acre feet of long-term storage credits. To ensure the agreement was not burdensome to Arizona water users, AWBA would store only water in excess of the state's needs.

Nevada could then recover those credits at a later date by paying full price to CAP for delivery, storage and recovery of the stored water that would then go to CAP customers. This would entitle Nevada, by exchange, to an additional amount of water from Lake Mead. In effect, AWBA would be storing Arizona's water in Arizona at Nevada's expense. In turn, Nevada would earn the right to withdraw additional supplies from Lake Mead.

Nevada entered into the 2001 agreement anticipating its water needs would be met through 2016 by surplus water made available through the Interim Surplus Guidelines. After 2016, Nevada intended to utilize credits stored on its behalf by AWBA as a "bridge." In other words, the credits would provide a water supply for use in excess of Nevada's 300,000 acre-foot Colorado River allocation while the state developed other long-term supplies.

Drought, however, thwarted these plans. Surpluses under the ISG are no longer available, with Lake Mead's current storage content below the critical threshold established in the ISG. Thus, Nevada needs a new strategy to meet its water needs. Nevada approached Arizona to initiate negotiations to amend the 2001 Agreement.

Nevada's needs, addressed by the 2001 agreement, are now more critical because of drought, growth in demand and threatened water shortages. Negotiations between the AWBA and Nevada offered an opportunity for Arizona to gain some advantages by providing Nevada water banking services.

Politics are Paramount

What many view as the big breakthrough promised by the amendment is its strengthening of Arizona-Nevada interstate relations. If drought is demonstrating the advantages of the Colorado River basin states cooperating to plan for and cope with shortages, the amendment is working out details to ensure that at least Arizona and Nevada work together to protect their water interests.

In working out the amendment with Nevada, Arizona gains an ally in negotiations among other basin states to develop guidelines to deal with shortages on the Colorado River. Arizona's prime concern is CAP's junior priority status to Colorado River water. If a shortage is declared, Arizona's CAP water would be the first cut. The amendment gets Nevada on Arizona's side as the state works to gain equal footing with the other states in the event of river shortages.

Some speculate that Nevada may also prove useful as Arizona addresses other concerns. For example, Nevada's support would boost Arizona's arguments for the federal government to begin operations of the Yuma Desalting Plant.

Also, by providing Nevada with a firm water supply, the agree-

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ment is seen to promote more effective and productive Colorado River discussions among the basin states. Nevada's acute water needs would be an issue to complicate whatever negotiations might occur.

Terms of the Agreement

The amendment provides advantages to both states. Some terms within the amendment are the same as what was included in 2001 agreement. For Nevada, the crux of whatever deal is worked out is obtaining critically needed water supplies, and the amendment still ensures Nevada's access to 1.25 million acre feet of excess CAP water. Further, Nevada would continue to bear the full cost of storing and later recovering the water.

The amendment also includes some significant changes to the agreement. Per the original agreement, AWBA promised its "best effort" to store sufficient supplies of Colorado River water to enable Nevada to pay for and earn 1.25 million acre-feet of long-term storage credits. The amendment changes "best effort" to "guarantee" of specific annual delivery amounts. Some officials are nervous with the word change. It is argued in response that although a guarantee creates some risks for shorting Arizona, the amendment's financial and political advantages make it a risk worth taking.

Also the amendment reduces the annual recovery obligation. Under the 2001 agreement, Nevada could request recovery up to 100,000 acre feet in any given year. The amended agreement's upper limit is only 40,000 acre feet except during shortage years.

The amendment also differs from the agreement by paying Arizona \$100 million up front in January 2005. The funds are to assist Arizona acquire alternative supplies in the event its obligation to Nevada cannot be met with CAP water. Discussions about possible options for developing alternative water supplies include paying willing partners to fallow land and purchasing a water ranch. According to AWBA and CAP calculations, however, such a situation

is unlikely, with studies indicating that sufficient water will be available to bank to meet the 1.25 million acre-foot obligation even after all Arizona water needs are met.

Along with the \$100 million Arizona also will receive ten annual payments of \$23 million beginning January 2009 to pay for storage. Recovery of that water would accelerate the development of needed water-recovery plans and help pay for required infrastructure.

A further advantage is that an interstate water banking arrangement provides revenues to Arizona to fund environmental programs. Excess CAP water delivered for interstate water banking purposes includes a fee collected in lieu of the ad valorem property tax currently levied within the CAP service area. With this property tax equivalency component set at \$20 per acre foot in 2004, developing 1.25 million acre feet of credits would ring up revenues in excess of \$24 million.

Both the original agreement and the amendment provide this benefit, but the amended agreement provides the funds up front, thus allowing a more flexible use of them. The funds could be used to support the Arizona Water Protection Fund and Arizona's portion of the Multi-species Conservation Program.

Lest the AWBA's budget again tempt raiders, steps are being taken to protect funds obtained through the amendment. Plans call for the money to be deposited in an interest bearing account with strict controls on its use. The AWBA Commission will provide oversight of expenditures that would occur only after public input. The expenditures would then be detailed in the AWBA annual plan of operation which is subject to public review and comment prior to its approval.

The Central Arizona Water Conservation District approved the amendment at its Dec. 2 meeting, and the AWBA Commission followed suit at its Dec. 9 meeting. The Southern Nevada Water Authority is scheduled to meet Dec. 16 to discuss the amendment. Its approval is expected. ■■



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