

Lake Havasu City Water Resources and Law of the Colorado River

Quick Synopsis of the Law of the River

The Colorado River Compact passed in 1922, set the foundation for the Law of the River by defining the upper and lower basins of the river and apportioning 7.5 million acre-feet per year (mac/y) to each. An acre-foot is about 325,851 gallons. The Upper Basin states are Colorado, New Mexico, Utah and Wyoming with the northeastern corner of Arizona included (Figure 1). The Lower Basin States are Arizona, California and Nevada.



Figure 1: Upper and Lower Colorado River Basins as outlined in the 1922 Colorado River Compact

This and subsequent legislation and judicial decrees reflect the basic water rights premise in the western United States of “First in Time, First in Right”, which sets the framework for today’s Colorado River priority system (Table 1). The 1964 Supreme Court decision, *Arizona v. California*, defined individual water entitlements (contracts) secured through the Bureau of Reclamation (Reclamation) prior to June, 1929 are considered present perfected water rights and are of top priority when considering annual water allocations. The decree also solidified the Lower Basin State’s maximum annual allocations first apportioned in the 1928 Boulder Canyon

Project Act; California may use up to 4.4 mac/y, Arizona 2.8 mac/y, and Nevada 0.3 mac/y. California and Nevada water entitlements are also known as consumptive use contracts. This means that the amount of water they use and return to the Colorado River can be further diverted. For example, Nevada's Colorado River annual limit is 300,000 acre-feet, but they actually withdraw more than that because some of the water they use and treat is returned to the river for credits to take out more, up to the amount they return.

Table 1: Some of the more significant federal regulations established for the Colorado River.

- **1922 Colorado River Compact**
 - Established the Upper and Lower Basins and assigned 7.5 Maf water apportionments for each.
- **1928 Boulder Canyon Project Act**
 - Authorized Hoover Dam and All-American Canal Construction and set state entitlements – CA -4.4Maf, AZ-2.8Maf, NV-.3Maf
- **1944 Mexican Water Treaty**
 - Guaranteed 1.5 Maf to Mexico
- **1964 AZ vs CA Supreme Court Decree**
 - Defined consumptive use, present perfect rights, AZ & NV tributaries are not subject to federal water control
- **1968 Colorado River Basin Project Act**
 - Authorized CAP Construction, sets contract priorities relative to shortages, sets Mexican Treaty priority as a national obligation

In Arizona, the situation is a bit different. Due to negotiations for the passage of the 1968 Colorado River Basin Project Act, which authorized the construction of the Central Arizona Project (CAP), Arizona now has a junior water right priority status as a state. There are 1st priority present perfected rights as mentioned above including the consumptive use designation, but there are also 2nd through 6th priority entitlements. Second and 3rd priority entitlements, which are actually co-equal in priority, consist of federal reserves (land management agencies, military installations, and two off-river Native American reservations) and water contracts that were signed between 1929 and 1968 known as perfected water rights. Some of the 3rd priority entitlements are consumptive use and some are diversion contracts, which do not allow for return flow credits to the river. Entitlements for permanent water supply signed in late 1968 and later have 4th priority status and are diversion contracts. The 5th and 6th priority contracts are for surplus Colorado River water when that status is declared by Reclamation.

Specific to Colorado River water mainstream users in Arizona, that is water providers living along the river, there are some federal and Arizona state policies and laws that dictate what water can be and cannot be used. A 1996 United States Geological Survey study ascertained geographical limits of the groundwater hydrologically connected to the lower Colorado River and its reservoirs. If the groundwater is influenced by the river, then it is considered part of the river system and under federal control (i.e. it is Colorado River water). The groundwater

geographical limits usually range across the river valley until bedrock of the mountains is encountered. In the Lake Havasu area, the normal high surface elevation of the lake (i.e. 449.6 feet above mean sea level (amsl)) is considered the upper elevation of Colorado River water and is called the accounting surface, which is also used for the water table elevation in the sands and gravels that make up the valley floor (Figure 2). If a water well is drilled through the water table and the water level in the well, when not pumped, is at or below the 449.6 feet amsl elevation, then the water is under federal control and one must have a contract with Reclamation to pump that well. If the water level is above that elevation, then the water is considered groundwater migrating from the mountains, which is not under federal or state control and is water that can be used without a contract. Groundwater in Arizona is not apportioned and can be diverted by land owners. Arizona has one restriction with groundwater that does not help Lake Havasu City. A groundwater basin is an area which collects (recharges) precipitation runoff into a central large-scale depression filled with sediment or other permeable rock capable of storing groundwater. Arizona Revised Statute 45-544 prohibits transferring groundwater from one groundwater basin to another. The Lake Havasu Basin is extremely small and almost wholly influenced by the river, so there is little opportunity to use the limited groundwater above the accounting surface (although the City is using a little bit – discussed below) and no way to import groundwater from the adjacent Sacramento Valley to the north and east.

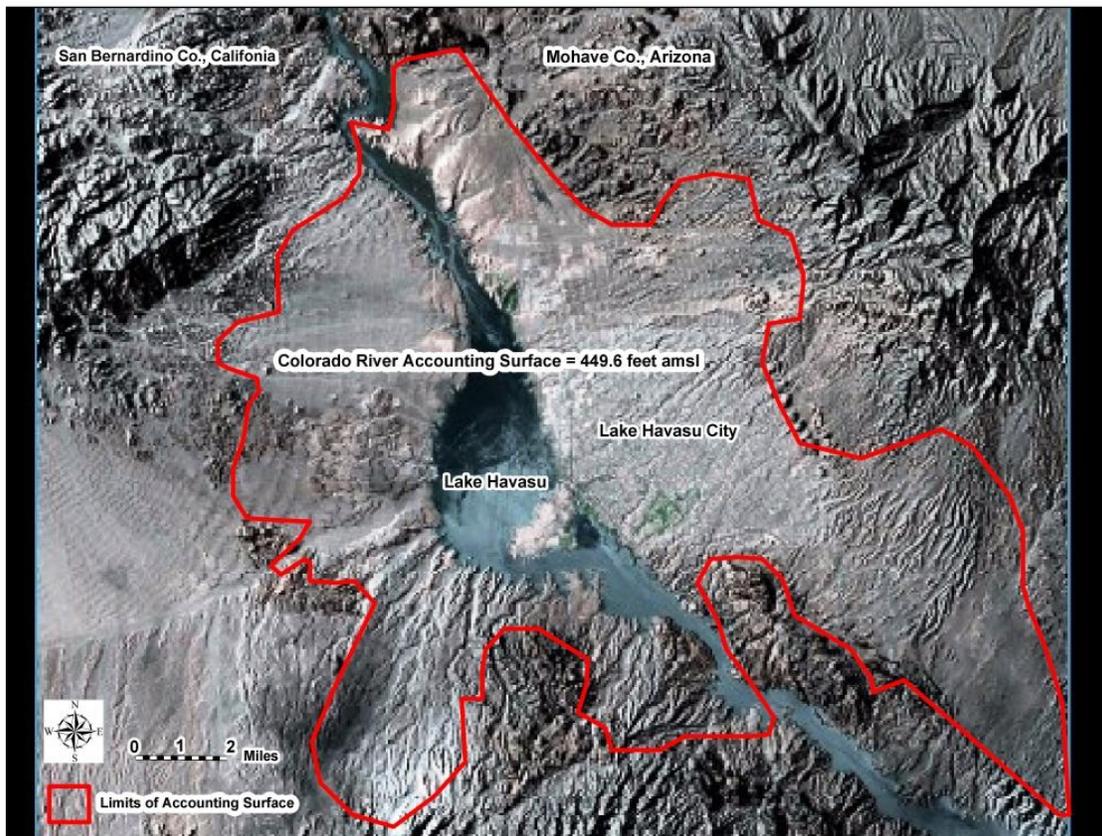


Figure 2: The extent of the Colorado River accounting surface in the Lake Havasu basin.

Lake Havasu City Water Acquisitions and Potential Colorado River Shortages

Lake Havasu City was issued a 4th priority Colorado River water rights entitlement for 14,500 acre-feet from Reclamation on November 14, 1968, less than two months after the passage of the Colorado River Basin Act. Since that initial amount, the City has gained another 13,831.7 ac-ft for a total of 28,331.7 ac-ft as of 2013 (all 4th priority water) through various acquisitions (Table 2). The Kingman and Cibola acquisitions are actually subcontracts from the Mohave County Water Authority (MCWA), a state legislated, non-taxing authority specifically enacted to work with its members to facilitate Colorado River water transfers and address related issues such as firming of banked water in central Arizona (<http://mohavecountywaterauthority.com>) .

Table 2: Lake Havasu City’s 4th Priority Colorado River water acquisitions to 2013.

Year Acquired	Volume (ac-ft)	Comments
1968	14,500	Initial contract with Reclamation
1983 & 1987	331	Horizon Six, Anazazi, Sunset Mobile Park amendments to 1968 contract
1990	4,349	ADWR reapportionment - amended Reclamation contract
1995 & 2010	7,000	Subcontract with MCWA of Kingman’s CR water entitlement
2007	2,139	Subcontract with MCWA of CR water transfer from Cibola – Note: can only be used either when all other water is used or to cover water demand during federally declared shortages.
2013	12.7	Transfer from Cibola dedicated for a specific development in LHC
TOTAL	28,331.7	

Fourth priority status has an additional restriction besides not receiving return flow credits; this water is the first to be subject to a federally declared water shortage on the Lower Colorado River. Until at least 2026, if Lake Mead’s water elevation decreases to 1075 feet amsl or lower, the Secretary of the Interior will issue a declaration of reduced Colorado River water deliveries below Hoover Dam, 400,000 ac-ft worth. This reduction may apply partially to Nevada and Mexico (3% and 16.7%, respectively), but these percentages are uncertain. The Mexico shortage share amount still needs to be negotiated and they may not take part in the process when the time comes. The impact to Arizona 4th priority contracts, including the water diverted by CAP, the largest diverter of Colorado River water in the state, will be between (80-97%). The impact to Lake Havasu City’s entitlement is somewhat uncertain, but could be up to a one-third reduction. Further decreases in Lake Mead’s elevation will trigger further delivery reductions (1050’ amsl – 500,000 ac-ft; 1025’ – 600,000 ac-ft; and <1025’ – renegotiation with the states, but regardless, it will not be pretty for 4th priority users).

Up to this point (October 2012) a shortage has never been declared; however, Lake Mead’s water elevation dipped to 1082 feet amsl in October 2010, just seven feet shy of the first trigger elevation (Figure 3). Fortunately, the ensuing winter had record snow packs in the source water region of the Rocky Mountains and Lake Mead rose over 30 feet the following spring and

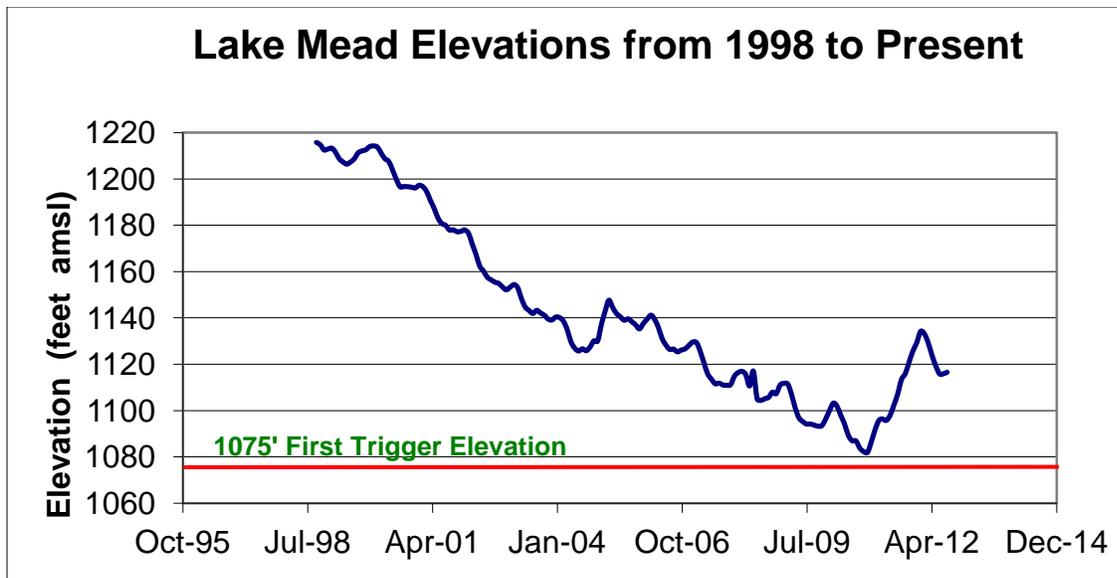


Figure 3: Lake Mead monthly averaged elevations from 1998 to August 2012.

summer. Reclamation and regional water agencies like the CAP predict the first chances of a shortage will be in 2016, depending of course, on the winter snow accumulations.

Shortage Preparations and Overall Water Portfolio

Lake Havasu City has taken steps to minimize the impacts that may be experienced, at least with the initial reductions. The city along with other 4th priority users negotiated an agreement through Arizona Department of Water Resources in 2006 for an intrastate shortage sharing agreement, in which any assigned reductions to Lake Havasu City will be from its entitlement instead of from the previous year's allocation actually used. This provision is clearly stated in the City's Colorado River contract document with Reclamation; however, some interests elsewhere believe that federal legislation (1968 Colorado River Basin Project Act) infers that reductions should be taken from the prior year use. At any rate, the agreement is in effect until 2026 and is supported by Reclamation. Further negotiations will be needed to plan beyond that time frame.

Lake Havasu City also took advantage of an offer in 2005 by the Arizona Water Banking Authority to firm a specified amount of stored Colorado River water (113,074 ac-ft) in central Arizona for use only during declared Colorado River water shortages when the City's annual allocation is smaller than the demand within the City's contracted water service area. This is in addition to 950 ac-ft of stored long-term credits that the City separately purchased in 2003. An additional 11,992 ac-ft were added in 2010. All of this water cost the City to reserve the water, which can be used as a down payment when the water needs to be withdrawn. The water in central Arizona will be sold to users in that area and Lake Havasu City will be able to pump an equal amount of Colorado River water from its own wells. The City will have to pay the Arizona Water Banking Authority to recover and deliver the water to the buyers and, more

importantly, will have to either replace that volume of water to the banking authority or pay a commodity rate for the water. Replacement costs will be the major expense of this process. The stored water is available until 2096, but the total water volume firmed can only be used once.

Along these lines, the acquisition of 2,139 ac-ft from the Cibola Irrigation and Drainage District (CIDD) can only be used either during shortages and of course, since this is 4th priority water, it too will also be reduced, or when water demand maximizes the rest of the City's Colorado River allocation during a normal water supply year. This water transfer was accomplished through a complex agreement involving Reclamation through its Lower Colorado River Multispecies Conservation Program, farmers within the CIDD, La Paz County where the land is located, and the MCWA that brokered the deal.

The MCWA is also in the last stages of negotiations to complete an agreement with the Mohave Valley Water Irrigation and Drainage District to have farmers fallow land during shortages. The reductions in irrigation on those parcels will translate to more water available to municipal members of the Authority (Lake Havasu City, Bullhead City and Golden Valley), but at the cost of lost commodity income to the farmers. The farmers will be compensated through the agreement by members who select to use the water. An agreement is expected to be finalized in 2013.

Table 3: Lake Havasu City Water Portfolio (as of 2013)

- 28,331.7 ac-ft – 4th Priority Colorado River Water under contract or subcontract.
- 126,016 ac-ft – Long Term Storage Credits Firmed with Arizona Water Banking Authority.
- 2,000 to 2,500 ac-ft – Wastewater Effluent Reused per year out of ~4,100 ac-ft generated.
- Very limited groundwater accessible above the accounting surface for small scale irrigation (<20 ac-ft).
- Proposed subcontract with MCWA for land fallowing during federally declared CR shortages.

Beyond water acquisition, Lake Havasu City is also conscious of improving its water use efficiency through treated wastewater reuse and water conservation efforts. Water conservation is discussed separately. Approximately one-fourth of the City's water diversion enters its sewer collection and treatment system as the other 75% is used for non-recyclable activities such as irrigation, construction, industry, evaporation (swimming pools), and other outdoor uses. Of the water that is treated after use (effluent), between 50- 65% (depending on the weather for the year) is recycled to irrigate three golf courses and a handful of smaller irrigation needs on the Island. The rest is disposed in either percolation ponds at the Island Wastewater Treatment Plant or injected into the ground at the North Regional Wastewater Treatment Plant by the airport (see the Follow the Water virtual tour). Since the end of the City's wastewater sewer expansion program in 2011, in which over 22,000 septic tanks were decommissioned and 85% of

the City is now sewered, the volume of effluent generated has increased to just over 4 million gallons per day. This amount is ordinarily enough to irrigate many of the City’s parks, landscape and school facilities that today are using treated drinking water. The main problem faced with using effluent instead of drinking water is storing the effluent for later retrieval. The irregular irrigation demand between winter and summer creates conditions in the winter, when demand is low, in which much of the generated effluent cannot be directly used (Figure 4). Conversely, during the summer the irrigation demand is higher than effluent is generated, so more water is needed. The ability to store and recover the effluent is key to successfully increase water recycling and lowering the rate of Colorado River water diversion.

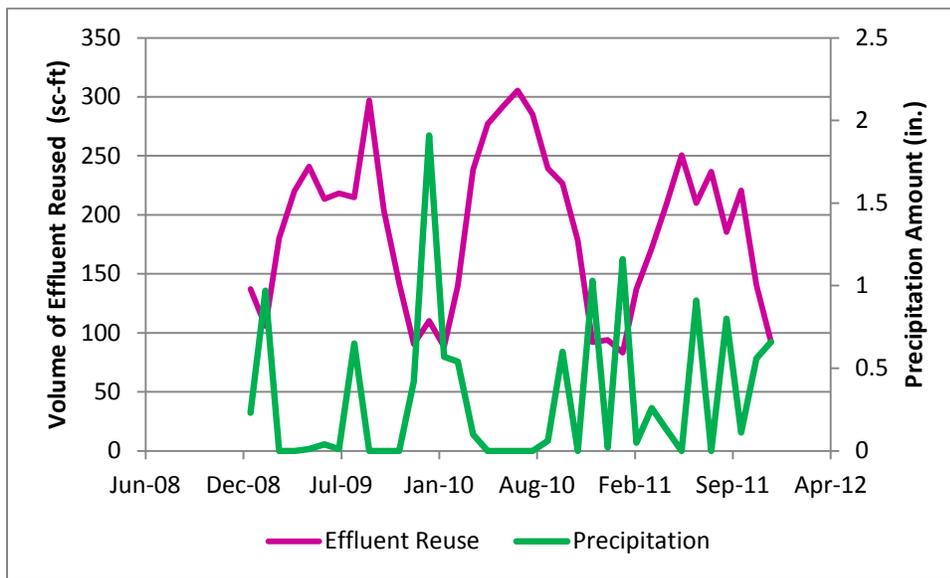


Figure 4: Monthly effluent reuse volumes from 2008 through 2010 showing low winter demand and high summer demand. Note the varying curve pattern for each summer, which is influenced by the precipitation amounts.

Storage is the major problem in that if the effluent percolates into the ground and quickly migrates below the accounting surface as in the case at the Island and Mulberry wastewater treatment plant ponds, then it would become federal water once again and if the City tries to reuse that water, it will count against their allocation. The City does not have the room to construct large surface ponds far above the accounting surface and there is only one area feasible for recharging the effluent by well injection. The City has been recharging treated wastewater effluent into the subsurface at the North Regional wastewater treatment plant south of the airport since late December 2008 (see Figure 54 on the Follow the Water virtual tour). The intent is to inject effluent into the subsurface above the regional water table, create a water mound that would act as a temporary storage facility and recover that water through production water wells during the warmer months. This “extra” effluent would cover the shortfalls of irrigation demand

during the summer and could be delivered to landscaping that today uses treated drinking water. The City is currently examining options to recovering this water.

The City is also trying to reduce drinking water irrigation by converting a monitoring well at City Hall to a small-scale irrigation well. The water level in this well is far above the accounting surface and what limited groundwater there is available should be sufficient to irrigate City Hall and Police Station landscaping. The City secured a grant from Reclamation to facilitate the conversion process that should be completed in 2013. This is a demonstration project that if successful, may be applied to appropriate parks around the city.

Lastly, the City's Water Division over the last ten years has vastly increased water efficiency in its water distribution and storage system, which has involved implementing leak detection surveys, upgrading water service lines coincident with sewer line construction, upgrading old water service meters and upgrading/modernizing water booster and storage tank stations. All of these measures have contributed to decreasing the volume of unaccounted water losses by about one-half.