## Colorado River

# Background

Colorado river is governed by two treaties: 1922 Colorado River Compact (Law of the river) and the 1944 Treaty between the United States and Mexico. The compact divided the Colorado River into two sections: the Lower Basin, which includes Arizona, Nevada, and California, and the Upper Basin, which includes Colorado, New Mexico, Utah, Wyoming, and Arizona. Each basin gets 7.5 maf/yr of consumptive use. Mexico gets 1.5 maf/yr plus an additional 200,000 af when a surplus is declared. Thus, annual total consumptive use of 16.5 maf/yr is allocated. The Compact also required the Upper Basin not to deplete the river’s flow to less than 75 MAF during any 10 consecutive years.

The 2 largest reservoirs are:

* Lake Powell: For Upper Basin users (to avoid violation of the non-depletion obligation)
* Lake Mead/Hoover Dam: For Lower Basin users

Lower Basin users and Mexico use all their 9 maf/yr apportionment of the Colorado river whereas Upper Basin consumptive uses averaged 3.7 MAF/year.

In the Lower Basin, Hoover Dam, completed in 1936, provides the majority of the Lower Basin’s storage and generates about 4.2 billion KWh of electricity per year for customers in California, Arizona, and Nevada.34 Also important for Lower Basin Operations are:

* Davis Dam/Lake Mohave, which regulates flows to Mexico under the 1944 Treaty,
* Parker Dam/Lake Havasu, which impounds water for diversion into the Colorado River Aqueduct (thereby allowing for deliveries to urban areas in southern California) and CAP (allowing for diversion to users in Arizona).
* Imperial Dam (a diversion dam), Further downstream on the Arizona/California border, diverts Colorado River water to the All American Canal for use in California’s Imperial and Coachella Valleys (Stern et al., n.d.).

In the table below, Annual Apportionments for each state in the upper and lower basin are found.

A screenshot of a document

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# Main Agreements

* The Colorado River Compact of 1922 - The cornerstone of the "Law of the River”

First negotiation between upper and lower basin states

* The Boulder Canyon Project Act of 1928

Apportionment of lower basin's 7.5 maf among the states

* California Seven Party Agreement of 1931

Settled the long-standing conflict between California agricultural and municipal interests over Colorado River water priorities.

The priorities are as follow:

* Priority 1: Palo Verde Irrigation District 104,500 acres
* Priority 2: Yuma Project 25,000 acres
* Priority 3: 3,850,000 acre feet equal rights (1,2,3a and 3b should not exceed 3,850,000)
  + 3(a) Imperial Irrigation District and other lands under or that will be served from the All American Canal in Imperial and Coachella Valleys
  + 3(b) to Palo Verde Irrigation District for use exclusively on 16,000 acres in that area known as the “Lower Palo Verde Mesa”
* Priority 4: MWD and/or the City of Los Angeles 550,000 acre feet
* Priority 5:
  + (a) MWD and/or the City of Los Angeles, with an additional entitlement of 550,000 acre-feet
  + (b) The City of San Diego and/or County of San Diego, with an entitlement of 112,000 acre-feet annually. These two rights are equal in priority.
* Priority 6: 300,000 acre-feet
* (a) IID and other lands served by the All American Canal in Imperial and Coachella Valleys
* (b) Palo Verde Irrigation District for use on 16,000 acres in the Lower Palo Verde Mesa area
* Priority 7: Any remaining water for agricultural use within the Colorado River Basin in California
* Quantification settlement agreement 2003

Prior to the 2003 finalization of the QSA, California had been using approximately 5.2 MAF of Colorado River on average each year (with most of its excess water use attributed to urban areas). Under the QSA, which is an agreement between several California water districts and DOI, California agreed to reduce its use to the required 4.4 MAF under the Law of the River (Stern et al., n.d.)

This agreement defined the rights to a portion of Colorado River water for:

* San Diego County Water Authority
* Coachella Valley Water District
* Imperial Irrigation District
* Metropolitan Water District of Southern California

The Quantification Settlement Agreement confirmed:

* the Imperial Irrigation District’s Colorado River annual allotment at 3.1 million acre-feet
* the Coachella Valley Water District’s Colorado River annual allotment at 330,000 acre-feet

The Quantification Settlement Agreement also established:

* the IID-San Diego County Water Authority water transfer
* A transfer of 105,000 acre-feet annually between IID and Metropolitan

A transfer of as much as 103,000 acre-feet annually between Imperial and the Coachella Valley district (*Quantification Settlement Agreement*, 2020; San Diego County Water Authority, n.d.)

A graph of water supply

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Under the 1931 priority system that has formed the basis for the distribution of Colorado River water made available to California, Metropolitan holds the fourth priority right to 550,000 acre-feet per year. This is the last priority within California’s basic apportionment. In addition, Metropolitan holds the fifth priority right to 662,000 acre-feet of water, which is in excess of California’s basic apportionment. Until 2003, Metropolitan had been able to take full advantage of its fifth priority right as a result of the availability of surplus water and water apportioned to Arizona and Nevada that was not needed by those states. However, during the 1990s, Arizona and Nevada increased their use of water from the Colorado River and by 2002 no unused apportionment was available for California.

Reservoirs in Lower Colorado River Basin

The two largest reservoirs in the Colorado River system, Lake Mead and Lake Powell. Lake Powell is for the upper basin and lake mead for the lower basin. The sequence of lower Colorado basin reservoirs/dams is as follows:

Hoover Dam/Lake Mead, Davis Dam/Lake Mohave, Parker Dam/Lake Havasu, Palo Verde Diversion Dam, Imperial Dam (Other minor dams have been omitted, more can be found on excel).

Colorado River is experiencing an ongoing drought since 2000 which has led to Lake Mead and Lake Powell reaching their lowest levels (“Megadrought in Southwestern North America Is Region’s Driest in at Least 1,200 Years,” 2022). The figure below shows how storage levels have decreased.

A graph of blue lines

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### MWD

Here I compare USBR diversions with that of MWD. Diversions in some years seem to be higher than what MWD claims to have received (This is weird). If we look at 2010, 2011, 2012 reports for consumptive use its almost the same as diversions. One possible explanation could be that SDCWA is getting some of the waters that is diverted to MWD. In 2010 and 2011 exchange between MWD and SDCWA happened where MWD received 150 taf /yr