

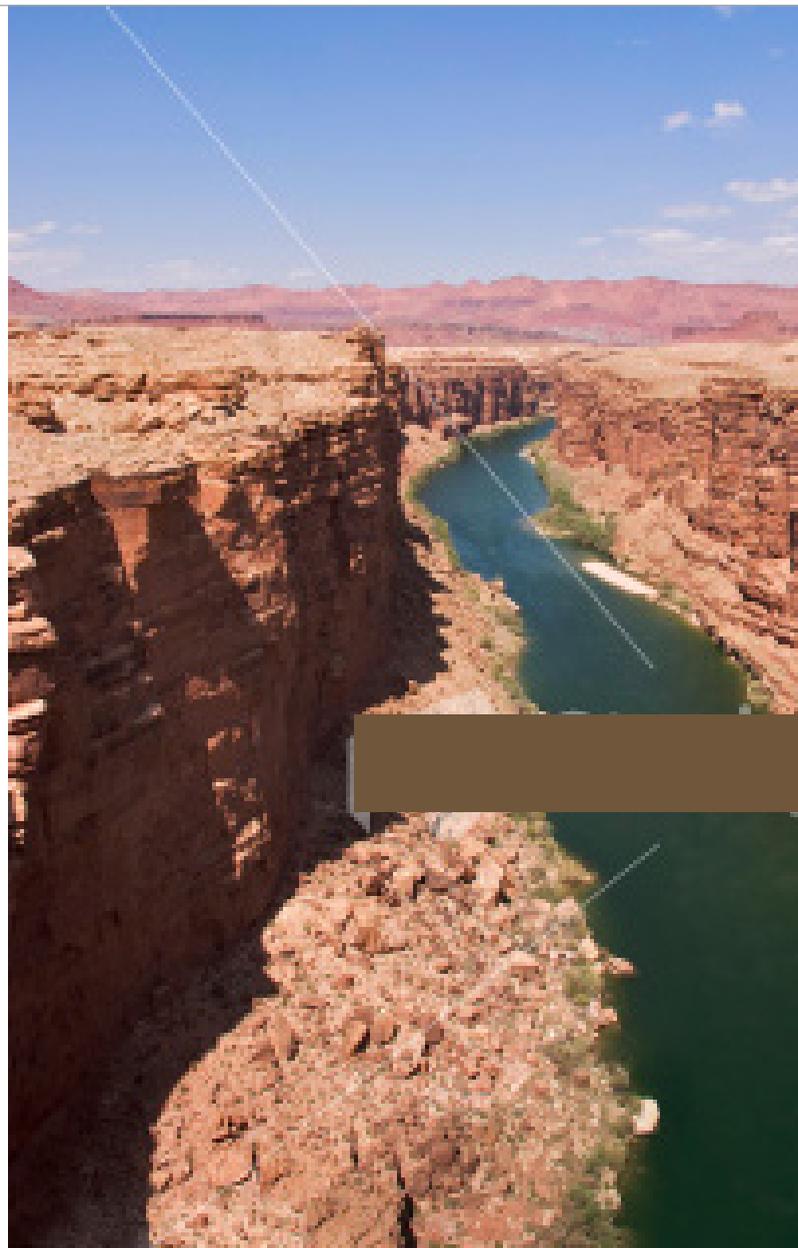
FLEXIBLE WATER MANAGEMENT STRATEGIES WITHIN A FIXED LEGAL FRAMEWORK

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The Colorado River has often been called the “lifeblood of the Southwest.” From its headwaters in the Rocky Mountains of Colorado, the river flows 1,450 miles before it empties into the Gulf of California. Despite the harsh, dry climate throughout the basin, roughly 30 million people depend on the Colorado River as a water supply source. Southern Nevada’s 2 million residents obtain nearly 90 percent of their water from the Colorado River. In addition to serving as a municipal water supply, Colorado River water is also used to irrigate more than 4 million acres of land in the United States and Mexico, and is used for industry, hydropower production, recreation, and fish and wildlife habitat.

Currently, the Colorado River basin is experiencing a drought unmatched in recent times. During water years¹ 2000-2008, unregulated inflows into Lake Powell above Glen Canyon Dam were only 62, 59, 25, 51, 49, 105, 73, 68 and 102 percent of the 30-year average of 12.06 million acre-feet (MAF).² Water managers across the region are challenged to provide a sustainable water supply to their stakeholders in the face of prolonged drought and an unpredictable climatic future. A recent study shows that, if a 10 percent reduction in the Colorado River’s average stream flow occurs due to climate change, there is a greater than 25 percent chance of fully depleting the basin’s reservoir storage by 2057.³

Reservoir storage along the river system is approximately 60 MAF, about four times the average annual flow. Nearly 85 percent of this storage is held in the basin’s two largest



reservoirs: Lake Powell (storing up to 24.3 MAF) and Lake Mead (storing up to 25.9 MAF). As of July 20, 2009, the capacity of Lake Powell was 67 percent, while Lake Mead stood at 43 percent of capacity.

The Law of The River

The Colorado River is managed and operated in accordance with federal laws, compacts, court decisions and decrees, contracts, international treaties and regulatory guidelines, collectively referred to as the “Law of the River.” This collection of documents defines the laws under which the Colorado River is managed and operated, and apportions and regulates the use of the water amongst the seven states and Mexico.



The United States Department of the Interior's Bureau of Reclamation provides legal oversight, and management and operation of the water diversion, delivery, storage, and hydroelectric power generation projects of the Colorado River system. Some key pieces of the Law of the River are outlined below.

1922 Colorado River Compact

The 1922 Colorado River Compact, the "cornerstone" of the Law of the River, establishes the foundation of the legal regime of the river. Following intense negotiations among representatives from the seven basin states, the compact divided the Colorado

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River basin into two basins – the Upper Basin (Colorado, New Mexico, Utah and Wyoming), and the Lower Basin (Arizona, California and Nevada) – and apportioned to each basin the beneficial consumptive use of 7.5 MAF of Colorado River water annually. Additionally, the compact stipulates that the states of the Upper Basin will not deplete the flow of the Colorado River at Lee Ferry⁴ below an aggregate of 75 MAF for any period of 10 consecutive years.

1928 Boulder Canyon Project Act

The 1928 Boulder Canyon Project Act (BCPA):

- (1) ratified the 1922 compact;
- (2) authorized the construction of Hoover Dam and related irrigation facilities in the Lower Basin;
- (3) authorized Arizona, California and Nevada to contract to apportion the 7.5 MAF Lower Basin apportionment so Arizona would receive 2.8 MAF/year; California, 4.4 MAF/year; and Nevada, 300,000 AF per year; and
- (4) directed the Secretary of the Interior to function as the sole contracting authority for Colorado River water use in the Lower Basin.

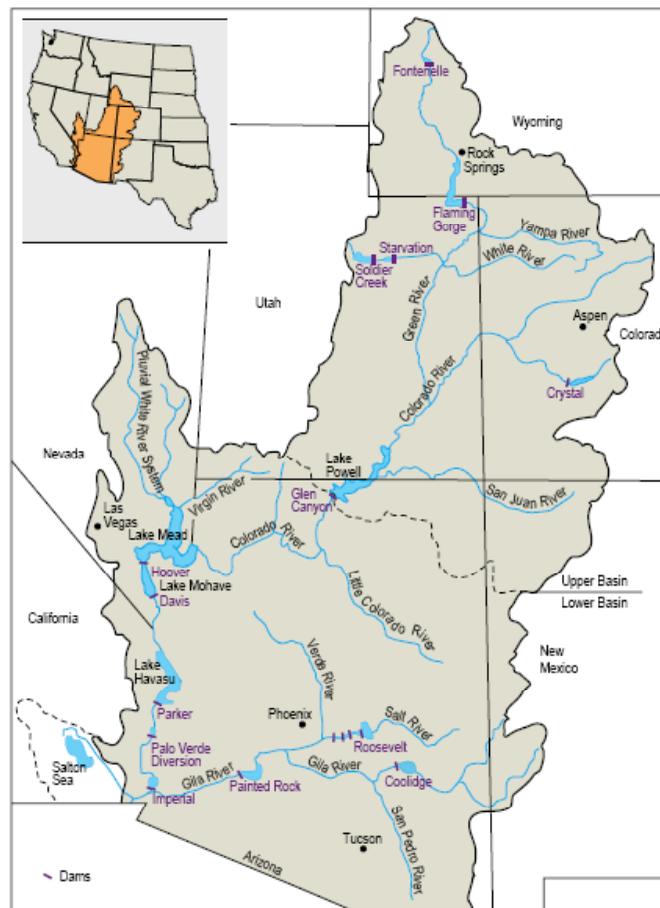
The BCPA set priorities for the use of Hoover Dam and the reservoir it created (Lake Mead): first, for river regulation, improvement of navigation and flood control; second, for irrigation and domestic uses and satisfaction of present perfected rights; and third, for power.

1944 Mexican Water Treaty

The United States-Mexico Treaty of 1944 guarantees an annual delivery of 1.5 MAF from the Colorado River to Mexico. The treaty provides for an increase in the annual delivery of 0.2 MAF per year in years when the United States determines there is a surplus. In case of extraordinary drought or serious accident to the irrigation system in the United States, the treaty provides for reductions in water allotted to Mexico in the same proportion as consumptive uses in the United States are reduced. The International Boundary and Water Commission has the duty of settling all disputes arising under the treaty.

1956 Colorado River Storage Project Act

The 1956 Colorado River Storage Project Act (CRSPA) authorized the construction of six dams and associated infrastructure in the Upper Basin, including Glen Canyon Dam. CRSPA provides for the regulation of the flow of the Colorado River, storage of water for beneficial consumptive use and usage of Colorado River apportionments by states of the Upper Basin. The Secretary of the Interior is authorized to



construct, operate, and maintain dams and water reclamation projects including Wayne N. Aspinall, Flaming Gorge, Navajo (dam and reservoir only) and Glen Canyon.

1964 Supreme Court Decree in *Arizona v. California*

Although the 1928 BCPA authorized the Lower Basin states to enter into an agreement to apportion their 7.5 MAF allocation amongst themselves, the states failed to do so. The continuing dispute among the states of Arizona, California and Nevada over the interpretation and effect of the Boulder Canyon Project led to a lawsuit in the United States Supreme Court and issuance of a decree in 1964. The Supreme Court’s 1964 decree makes clear that “mainstream water shall be released or delivered to water users (including, but not limited to, public and municipal corporations and other public agencies) in Arizona, California, and Nevada only pursuant to valid contracts therefore made with such users by the Secretary of the Interior, pursuant to § 5 of the Boulder Canyon Project Act or any other applicable federal statute.”

2005 Lower Colorado River Multi-Species Conservation Program & Implementing Agreements

The Lower Basin states, Department of Interior agencies and non-federal stakeholders along the lower Colorado River have formed a regional partnership and a first-of-its-kind multi-species conservation program aimed at protecting endangered, threatened, and sensitive fish and wildlife species and their habitats along the Colorado River, and at reducing the likelihood of additional species listings under the Endangered Species Act. The Lower Colorado River Multi-Species Conservation Plan (MSCP) works toward recovery of listed species through habitat and species conservation. Twenty-six federal- or state-listed candidate and sensitive species and their associated habitats are addressed in the MSCP. This 50-year program accommodates current water diversions and power production, consistent with the law. The program's estimated cost, in 2003 dollars, was \$626 million. The federal government pays 50 percent of the program's cost, and the participants in the states of Arizona, California and Nevada pay the remaining 50 percent.

2007 Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operation for Lake Powell and Lake Mead

On December 13, 2007, the Secretary of the Interior signed the record of decision for the Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead, implementing a new management regime for the two key reservoirs, which specifies the amount of water released from Lake Powell based on the elevations of both lakes. They also establish criteria for shortage declarations by the secretary and water augmentation programs. For example, Colorado River water contractors can now contribute capital to projects designed to improve water management by conserving water that would otherwise be lost to the system. In return, the secretary can offer the contractors a portion of the water that will be conserved over the life of the project.

Colorado River Governance

While the state engineer has jurisdiction over the development and use of Nevada's water resources, two other state agencies have jurisdiction over issues pertaining to the Colorado River: the Colorado River Commission of Nevada and the Southern Nevada Water Authority.

The Colorado River Commission of Nevada

The Colorado River Commission of Nevada (CRCN) was created by the Nevada Legislature in 1935 to secure Nevada's interests in the waters of the Colorado River and in electric power generated thereon. The commission consists of seven members, four appointed by the governor and three

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appointed by the board of directors of the Southern Nevada Water Authority.

In addition to its responsibility to purchase and deliver Nevada's allocation of hydroelectric power generated and marketed by the federal government, the CRCN represents the state of Nevada at all federal, interstate and international discussions regarding the management and operations of the Colorado River, and enters into agreements between Nevada and those entities concerning the:

- (a) acquisition, development, storage, transport, transfer, exchange, use and treatment of water to supplement the supply of water in the Colorado River, which is available for use in Nevada;
- (b) augmentation of the waters of the Colorado River;
- (c) quality of the waters of the Colorado River, in cooperation with, and subject to the authority of, any agency of this state which regulates environmental matters;
- (d) operation of federal dams and other facilities on the Colorado River; and
- (e) species associated with the Colorado River which are, or may become, listed as endangered or threatened, pursuant to federal law, in cooperation with, and subject to the authority of, any agency of this state which regulates environmental matters.⁵

Additional information on the roles and responsibilities of the commission can be found at www.crc.nv.gov.

The Southern Nevada Water Authority

The Southern Nevada Water Authority (SNWA) is a political subdivision formed in 1991 to acquire and manage long-term water resources for southern Nevada, construct and manage regional water treatment and distribution facilities, and promote responsible water use. See NRS 277.080 to 277.180. It was created through a cooperative agreement among the following seven member agencies:

City of Henderson, City of Las Vegas, City of North Las Vegas, Big Bend Water District (Laughlin), Clark County Water Reclamation District, Boulder City and the Las Vegas Valley Water District.

SNWA provides wholesale water treatment and delivery for the greater Las Vegas Valley. SNWA's two major water treatment facilities, the Alfred Merritt Smith Water Treatment Facility and the River Mountains Water Treatment Facility, can treat up to 900 million gallons of water a day.

SNWA develops and manages a flexible portfolio of diverse water resources. In addition to the Colorado River, this portfolio includes in-state resources such as other surface waters (i.e. Virgin and Muddy Rivers), groundwater rights and groundwater applications. SNWA also manages the region's conservation efforts and has one of the most successful and aggressive conservation programs in the country. For additional information about the agency's mission, responsibilities, and programs, please visit www.snwa.com.

Southern Nevada's Water Supply Management Strategies

As the flows of the Colorado River become increasingly susceptible to climate change, water managers are pursuing a diverse set of management strategies to create a flexible and sustainable water supply.

Supply-side Management Options

Intentionally Created Surplus (ICS): Under the guidelines developed by the Bureau of Reclamation, contractors of Colorado River water can – through projects that augment the storage of water in the Lower Basin and/or conserve Colorado River water to which they have a legal entitlement – receive credits for such water, and store these credits in Lake Mead for future use. There are four categories of ICS: Tributary Conservation ICS,

System Efficiency ICS, Extraordinary Conservation ICS and Imported ICS. SNWA can create up to 300,000 AF of ICS credits and is currently moving forward with three ICS projects: Coyote Spring Groundwater Imported ICS, Virgin and Muddy Rivers Tributary Conservation ICS, and Drop 2 Reservoir System Efficiency ICS. Additional information on each of these projects can be found at www.snwa.com/html/wr_colrvr_surplus_ics.html.

Augmentation: The basin states conducted an analysis of 12 potential long-term options that could augment the water supply of the Colorado River including: brackish water desalination, coalbed methane-produced water, conjunctive use of surface and groundwater, ocean water desalination, power plant reduction of consumptive use, reservoir evaporation control, river basin imports/exports (exchanges resulting in export reductions), stormwater

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storage, vegetation management, water imports using ocean routes, water reuse and weather modification. The complete study can be requested at www.snwa.com/html/wr_colrvr_augmentation.html. Any decision to proceed with a particular option would have to be coordinated with the U.S. Bureau of Reclamation and other stakeholders.

In-State Groundwater Resources: Groundwater provides approximately 10 percent of the total water supply for southern Nevada. As additional stress is placed on the Colorado River system, groundwater is becoming an increasingly critical component of the region's water supply. Currently SNWA has permanent groundwater rights totaling 46,340 AF. The SNWA also has a number of other groundwater permits and applications in southern and eastern Nevada.

Demand-side Management Options

Conservation: Since its inception, SNWA has implemented conservation programs to reduce overall water use throughout the region. These programs have

helped reduce per capita water consumption from over 320 gallons per capita per day (GPCD) in 1990 to approximately 250 GPCD today.⁶

Conclusion

Drought, population growth and climate change have caused the basin states and the federal government to negotiate flexible solutions to extend seemingly hardened water allocations while maintaining a level of certainty of water supply. The Law of the River has provided a framework which has adapted to permit creative river management strategies. With drought and water shortages looming, both the Colorado River Commission of Nevada and the Southern Nevada Water Authority provide leadership in developing regional and local solutions in meeting the burgeoning demand for water. [NL](#)

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- 1 The term "water year" refers to the period beginning on October 1 and ending on September 30 of the following year.
- 2 United States Bureau of Reclamation, Upper Colorado Region. www.usbr.gov/uc/feature/drought.html, accessed November 5, 2008.
- 3 www.aqu.org/sci_soc/prll/2009-20.html; Future of Water in U.S. West Threatened.
- 4 Lee Ferry is the dividing point between the Upper and Lower Basins; it is located one mile below the mouth of the Paria River on the main stem of the Colorado River.
- 5 NRS 538.161.
- 6 T.R. Witcher, "Water wise," July 16, 2008, Las Vegas Weekly website, www.lasvegasweekly.com/news/2008/jul/16/water-wise, accessed on November 4, 2008.