# Appendix A

## Overview of Colorado River Operations

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# Appendix A. Overview of Colorado River Operations

## A.1 Introduction

This appendix summarizes Colorado River operations, including the distribution of Colorado River water under the Law of the River, and the reservoirs and diversion facilities through which the water supply is administered.

## A.2 Apportionment of Water Supply

This section summarizes the Law of the River, Colorado River apportionments of the Basin States, and the allotment to Mexico pursuant to the 1944 Water Treaty.

### A.2.1 The Law of the River

The Secretary is vested with the responsibility to manage the mainstream waters of the Colorado River Basin pursuant to applicable federal law. This responsibility is carried out consistent with a body of documents commonly referred to as the Law of the River. The Law of the River comprises numerous operating criteria, regulations, and administrative decisions included in federal and state statutes, interstate compacts, court decisions and decrees, an international treaty, and contracts with the Secretary. Documents which are generally considered as part of the Law of the River include, but are not limited to, those listed in **Table A-1** below.

**Table A-1**
**Selected Documents Included in the Law of the River**

| | |
|---|---|
| ▪ The River and Harbor Act of March 3, 1899<br>▪ The Reclamation Act of June 17, 1902<br>▪ Reclamation of Indian Lands in Yuma, Colorado River and Pyramid Lake Indian Reservations Act of April 21, 1904<br>▪ Yuma Project authorized by the Secretary of the Interior on May 10, 1904, pursuant to Section 4 of the Reclamation Act of June 17, 1902<br>▪ Warren Act of February 21, 1910<br>▪ Protection of Property Along the Colorado River Act of June 25, 1910<br>▪ Patents and Water-Right Certificates Acts of August 9, 1912, and August 26, 1912 | ▪ The Colorado River Storage Project Act of April 11, 1956<br>▪ Water Supply Act of July 3, 1958<br>▪ Boulder City Act of September 2, 1958<br>▪ Report of the Special Master, Simon H. Rifkind, *Arizona v. California*, et al., December 5, 1960<br>▪ The Consolidated Decree entered by the United States Supreme Court in the case of *Arizona v. California*, 547 US 150 (2006) (Consolidated Decree)<br>▪ International Flood Control Measures, Lower Colorado River Act of August 10, 1964 |

**Table A-1**
**Selected Documents Included in the Law of the River**

- Yuma Auxiliary Project Act of January 25, 1917
- Availability of Money for Yuma Auxiliary Project Act of February 11, 1918
- Sale of Water for Miscellaneous Purposes Act of February 25, 1920
- Federal Power Act of June 10, 1920
- The Colorado River Compact of November 24, 1922
- The Colorado River Front Work and Levee System Acts of March 3, 1925, and January 21,1927-June 28, 1946
- The Boulder Canyon Project Act of December 21, 1928
- The California Limitation Act of March 4, 1929
- The California Seven Party Agreement of August 18, 1931
- The Parker and Grand Coulee Dams Authorization of August 30, 1935
- The Parker Dam Power Project Appropriation Act of May 2, 1939
- The Reclamation Project Act of August 4, 1939
- The Boulder Canyon Project Adjustment Act of July 19, 1940
- The Flood Control Act of December 22, 1944
- Treaty between the United States and Mexico Relating to the Utilization of the Waters of the Colorado and Tijuana Rivers and of the Rio Grande of February 3, 1944
- Gila Project Act of July 30, 1947
- The Upper Colorado River Basin Compact of October 11, 1948
- Consolidated Parker Dam Power Project and Davis Dam Project Act of May 28, 1954
- Palo Verde Diversion Dam Act of August 31, 1954
- Change Boundaries, Yuma Auxiliary Project Act of February 15, 1956
- Southern Nevada (Robert B. Griffith) Water Project Act of October 22, 1965
- The Colorado River Basin Project Act of September 30, 1968
- Criteria for the Coordinated Long Range Operation of Colorado River Reservoirs, June 8, 1970, amended March 21, 2005
- Supplemental Irrigation Facilities, Yuma Division Act of September 25, 1970
- 43 CFR 417 Lower Basin Water Conservation Measures, September 7, 1972
- Minute 218, March 22, 1965; Minute 241, July 14, 1972 (replaced Minute 218); Minute 242, August 30, 1973 (replaced Minute 241); Minute 306, December 12, 2000; Minute 317, June 27, 2010; and Minute 323, September 21, 2017, of the 1944 Water Treaty
- The Colorado River Basin Salinity Control Act of June 24, 1974
- Hoover Power Plant Act of August 17, 1984
- The Numerous Colorado River Water Delivery and Project Repayment Contracts with the States of Arizona and Nevada, cities, water districts and individuals
- Hoover and Parker-Davis Power Marketing Contracts
- Reclamation States Emergency Drought Relief Act of 1991
- Grand Canyon Protection Act of October 30, 1992
- Operation of Glen Canyon Dam, Record of Decision (1996)
- Interim Surplus Guidelines Record of Decision, January 17, 2001 (66 Fed. Reg. 7772).
- Interim 602(a) Storage Guideline, May 19, 2004 (69 Fed. Reg. 28945)
- Colorado River Water Delivery Agreement of October 10, 2003 (69 Fed. Reg. 12202)
- Glen Canyon Dam Long-Term Experimental and Management Plan – Final EIS and ROD, December 2016 (Reclamation 2016)
- Colorado River Basin Drought Contingency Plans (Reclamation 2019)

Among other provisions of applicable federal law, NEPA and the Endangered Species Act of 1973 (ESA), as amended, provide a statutory overlay on certain actions taken by the Secretary. For example, as noted in **Chapter 1**, preparation of this SEIS has been undertaken pursuant to NEPA.

## A.2.2 Apportionment to the Basin States

The initial apportionment of water from the Colorado River was determined as part of the Colorado River Compact (1922), which divided the Colorado River system into two sub-basins, the Upper Basin and the Lower Basin, and divided the seven Basin States into the Upper Division and the Lower Division (**Map A-1**).

The compact apportioned to the Lower Basin and the Upper Basin, in perpetuity, the exclusive beneficial consumptive use of 7.5 maf of water per year (mafy). In addition to this apportionment, Article III(b) of the compact gives the Lower Basin the right to increase its beneficial consumptive use by 1.0 mafy. The compact also stipulates in Article III(d) that the Upper Division States will not cause the flow of the river at the Lee Ferry Compact Point to be depleted below an aggregate of 75 maf for any period of ten consecutive years.

The compact, in Article VII, states that nothing in the compact shall be construed as affecting the obligations of the United States to Indian Tribes. While the rights of most Indian Tribes to Colorado River water were subsequently adjudicated, some Tribal rights remain unadjudicated. To the extent that Indian Tribes consumptively use water from the Colorado River, such uses are included in the apportionment of the appropriate Basin State.

**Upper Division State Apportionments.** Upper Division state apportionments were established by the Upper Colorado River Basin Compact of 1948. These apportionments allocate the Upper Division States' consumptive use after deduction of up to 50,000 acre-feet per year (afy) for Arizona as follows: Colorado, 51.75 percent; New Mexico, 11.25 percent; Utah, 23.00 percent; and Wyoming, 14.00 percent. The Upper Division State apportionments have not yet been fully developed.

**Lower Division State Apportionments.** Lower Division State apportionments were established by Congress in the Boulder Canyon Project Act (BCPA) and by the Secretary's water delivery contracts under the BCPA. These apportionments are Arizona (2.8 maf), California (4.4 maf), and Nevada (0.3 maf), totaling 7.5 maf, subject to annual increases or reductions pursuant to Secretarial determinations of a Surplus or a Shortage condition. Under Article II(B)(2) of the Consolidated Decree, when the Secretary determines that there is a Surplus Condition, 46 percent of the available water supply in excess of 7.5 maf may be apportioned for use in Arizona; 50 percent for use in California; and 4 percent for use in Nevada.

The Consolidated Decree confirms the apportionments to the Lower Division States established by the BCPA and guides the Secretary's operation of facilities, including Hoover Dam, on the lower Colorado River. If water apportioned for use in a Lower Division State is not consumed by that state in any year, the Secretary may release the unused water for use in another Lower Division State. Water that is stored off stream by a Lower Division State is accounted as consumptive use to the state that stored the water in the year it was stored.

All mainstream Colorado River waters apportioned to the Lower Basin, except for approximately 10,000 acre-feet (af) remaining of Arizona's apportionment, have been fully allocated to specific entities and, except for certain federal establishments, placed under permanent water delivery contracts with the Secretary for irrigation or domestic use. Federal establishments with federal reserved rights established pursuant to Article II(D) of the Consolidated Decree are not required to have a contract with the Secretary, but the water allocated to a federal establishment is included within the apportionment of the Lower Division State in which the federal establishment is located.

The highest-priority lower Colorado River water rights are present perfected rights (PPRs), which the Consolidated Decree defines as those perfected rights existing on June 25, 1929, the effective date of the BCPA. The Consolidated Decree also recognizes federal Indian reserved rights for the quantity of water necessary to irrigate all the practicably irrigable acreage on five Indian reservations along the lower Colorado River (the Chemehuevi Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, Fort Yuma-Quechan Tribe, and Cocopah Indian Tribe). The Consolidated Decree defines the rights of Indian and other federal reservations to be federal establishment PPRs, and further prescribes a specific order in which federal establishment and other PPRs must be satisfied, generally by priority date without regard to state lines. In any year in which less than 7.5 maf of Colorado River water is available for consumptive use in the Lower Division States, PPRs will be satisfied first.

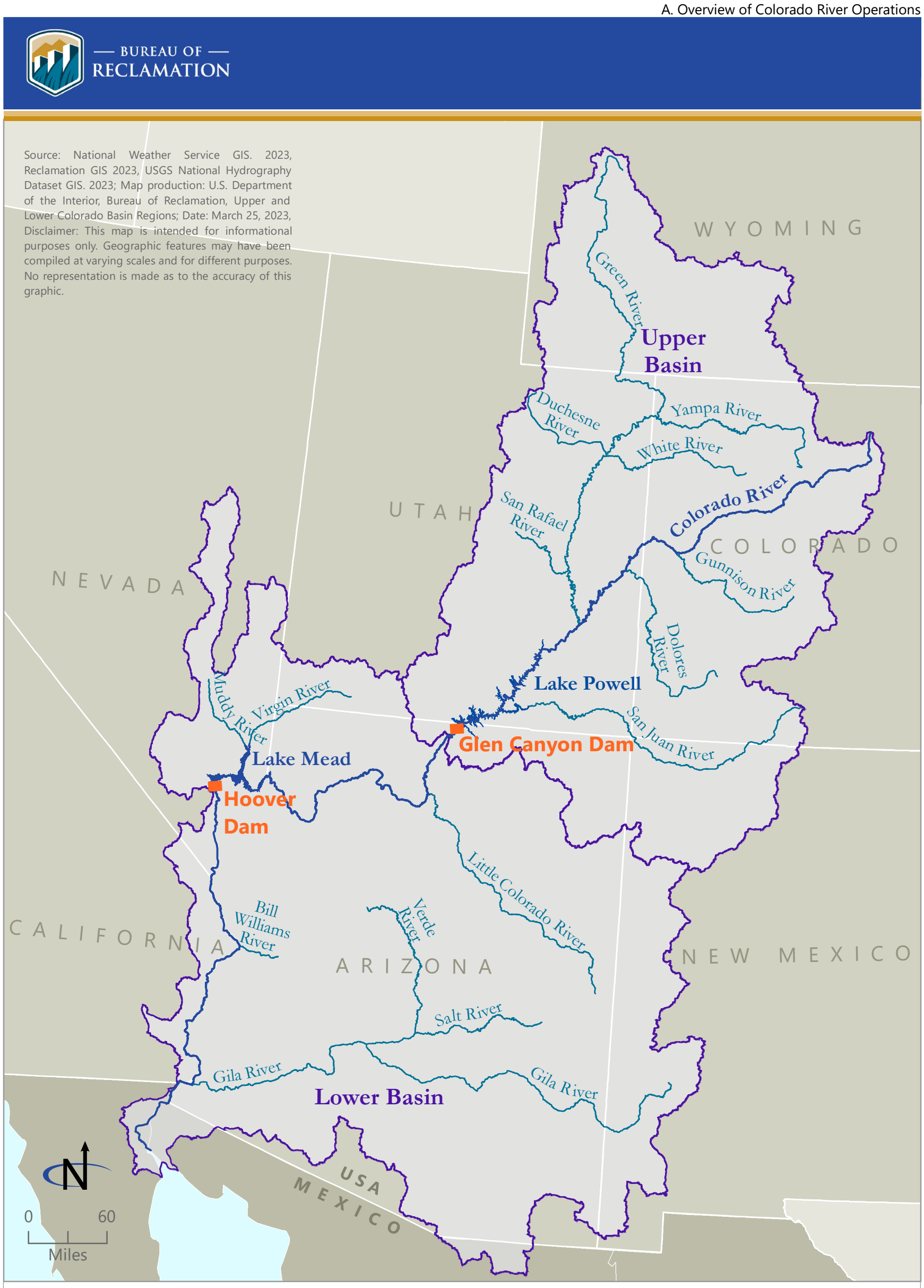
Waters available to a Lower Division State within its apportionment, but having a priority date later than June 25, 1929, have been allocated by the Secretary through execution of water delivery contracts to water users within that state, as required by Section 5 of the BCPA. The Lower Division States have separate intra-state priority systems in accordance with that body of contracts.

### A.2.3 Allotment to Mexico (Pursuant to the 1944 Water Treaty)

Allocation of Colorado River water to Mexico is governed by the 1944 Water Treaty. To assess the potential effects of the proposed federal action in this SEIS, certain modeling assumptions (discussed in **Chapter 2**) are used that display projected water deliveries to Mexico. These assumptions include continued implementation of Minute 323 to the 1944 Water Treaty.

Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy regarding deliveries to Mexico.

The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the USIBWC in consultation with the Department of State.




## Map A-1
## Upper and Lower Division States of the Colorado River

- Colorado River
- Colorado River tributary
- Dam
- Colorado River Basin, Upper and Lower Basins
- States in the Colorado River Basin (Wyoming, Colorado, Utah, and New Mexico are Upper Division states, and Arizona, California, and Nevada are Lower Division states)

While portions of northwestern Mexico are part of the Basin, these areas are not within the geographic scope of analysis for this SEIS. This is because the SEIS is not considering alternative actions that would change water deliveries to Mexico. The provisions of the 1944 Water Treaty and implementing Minutes are not affected by this SEIS.

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# A.3 Water Operations

## A.3.1 Lake Powell and Lake Mead and the Diversion Facilities

The Colorado River system contains numerous reservoirs that provide an aggregate of approximately 60 maf of storage. Of these reservoirs, Lake Powell and Lake Mead constitute approximately 83 percent of this storage; Lake Powell provides 23.3 maf of this storage, and Lake Mead can store up to 26.2 maf.

## A.3.2 Hydropower Generation

Reclamation is authorized by legislation to produce electric power at both Glen Canyon Dam and Hoover Dam. While Reclamation is the federal agency authorized to produce power at the major Colorado River system dams, WAPA is the federal agency authorized to market and deliver this power. WAPA enters into electric service contracts on behalf of the United States with public and private utility systems for distribution of hydroelectric power produced at Reclamation facilities in excess of project demand.

## A.3.3 Current Operational Guidelines

The following details the post-2007 Colorado River operational guidelines.

- Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead – Final EIS and ROD, November 2007 (Reclamation 2007)

  The 2007 Interim Guidelines are the specific interim guidelines for Lower Basin shortages and coordinated operations for Lake Powell and Lake Mead. These interim guidelines were intended to remain in effect for determinations to be made through 2025 regarding water supply and reservoir operating decisions through 2026 and would provide guidance each year in development of the AOP. The 2007 Interim Guidelines considered four operational elements that collectively are designed to address the purpose and need for the proposed federal action. The 2007 Interim Guidelines were used by the Secretary to:

  - determine those circumstances under which the Secretary would reduce the annual amount of water available for consumptive use from Lake Mead to the Colorado River Lower Division States (Arizona, California, and Nevada) below 7.5 million acre-feet (maf) (a "Shortage") pursuant to Article II(B)(3) of the United States Supreme Court Decree in the case of *Arizona v. California*, 547 US 150 (2006) (Consolidated Decree);
  - define the coordinated operation of Lake Powell and Lake Mead to provide improved operation of these two reservoirs, particularly under low reservoir conditions;
  - allow for the storage and delivery, pursuant to applicable federal law, of conserved Colorado River system and non-system water in Lake Mead to increase the flexibility of meeting water use needs from Lake Mead, particularly under drought and low reservoir conditions; and
  - determine those conditions under which the Secretary may declare the availability of surplus water for use within the Lower Division States.

- Glen Canyon Dam Long-Term Experimental and Management Plan – Final EIS and ROD, December 2016 (Reclamation 2016)

  Reclamation and the NPS developed and implemented the LTEMP for operations of Glen Canyon Dam, the largest unit of the Colorado River Storage Project (CRSP). The LTEMP provides a framework for adaptively managing Glen Canyon Dam operations through 2036 consistent with the Grand Canyon Protection Act of 1992 (GCPA) and other provisions of applicable federal law. The LTEMP determines the specific options for dam operations, non-flow actions, and appropriate experimental and management actions that meet the GCPA's requirements and minimize impacts on resources within the area affected by dam operations, commonly referred to as the Colorado River Ecosystem, including those of importance to American Indian Tribes.

- Colorado River Basin Drought Contingency Plans

  In 2019, the DCPs were signed pursuant to congressional direction provided in Public Law 116-14. The DCPs outline strategies to address the ongoing historic drought in the Colorado River Basin. The Upper Basin DCP is designed to reduce the risk of reaching critical elevations at Lake Powell and to help assure continued compliance with the 1922 Colorado River Compact.

  The DROA is one element of the Upper Basin DCP. The DROA identifies a process to temporarily move water stored in the CRSP Initial Units above Lake Powell—Blue Mesa Reservoir (a component of the Aspinall Unit), Flaming Gorge, and Navajo—to Lake Powell when it is projected to approach elevation 3,525 feet, which was identified in the DROA as the target elevation. This elevation provides a 35-foot buffer above the minimum power pool of 3,490 feet. Maintaining an elevation above 3,525 feet will help ensure compliance with interstate water compact obligations, maintain the ability to generate hydropower at Glen Canyon Dam, and minimize adverse effects to resources and infrastructure in the Upper Basin.

  Pursuant to the DROA, Reclamation worked with the Upper Division States on a Drought Response Operations Plan (Plan) in 2022 with the goal of implementing operational measures to augment water deliveries from the three upstream CRSP Initial Units (i.e., Wayne N. Aspinall, Flaming George, and Navajo) to prop up Lake Powell. Reclamation continues to closely monitor hydrologic conditions and projections to identify appropriate upstream release volumes to maintain Lake Powell water level above the target elevation.