BUREAU OF RECLAMATION

DRAFT Annual Operating Plan for Colorado River Reservoirs 2021

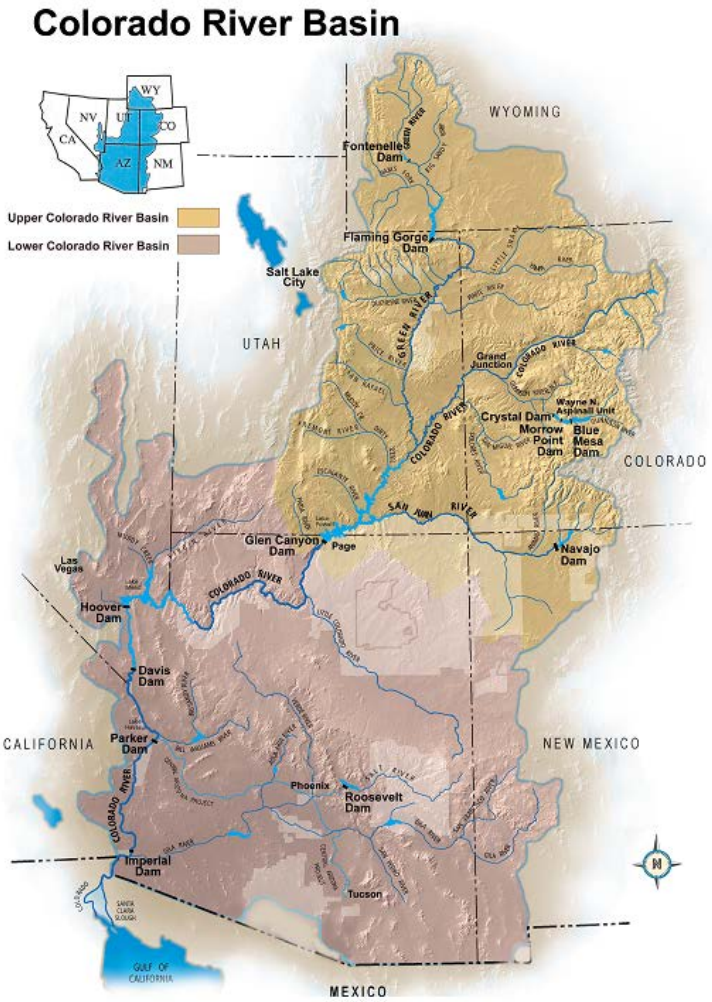

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TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

Background

Each year's Annual Operating Plan (AOP) for Colorado River Reservoirs reports on both the past operations of the Colorado River reservoirs for the completed year as well as projected operations and releases from these reservoirs for the current (i.e., upcoming) year. Accordingly, this 2021 AOP reports on 2020 operations as well as projected operations for 2021. In recent years, additions to the Law of the River such as operational rules, guidelines, and decisions have been put into place for Colorado River reservoirs including the 1996 Glen Canyon Dam Record of Decision[1] (ROD), the Operating Criteria for Glen Canyon Dam,[2] the 1999 Off-stream Storage of Colorado River Water Rule (43 CFR Part 414),[3] the 2001 Interim Surplus Guidelines[4] addressing operation of Hoover Dam, the 2006 Flaming Gorge Dam ROD,[5] the 2006 Navajo Dam ROD[6] to implement recommended flows for endangered fish, the 2007 Interim Guidelines for the operations of Lake Powell and Lake Mead,[7] the 2012 Aspinall ROD,[8] the 2016 Glen Canyon Dam Long-Term Experimental and Management Plan (LTEMP) ROD,[9] Minute No. 323 of the International Boundary and Water Commission (IBWC),[10] and the agreements related to the 2019 Colorado River Drought Contingency Plans (DCPs)[11] as

[1] ROD for the Operation of Glen Canyon Dam, October 9, 1996. Available online at: https://www.usbr.gov/uc/envdocs/rod/Oct1996_OperationGCD_ROD.pdf.

[2] Following the implementation of the LTEMP ROD, the Glen Canyon Dam operating criteria were revised and are in effect in water years 2019 and 2020 and available online at: https://www.usbr.gov/uc/water/crsp/studies/GCOC.pdf.

[3] Off-stream Storage of Colorado River Water; Development and Release of Intentionally Created Unused Apportionment in the Lower Division States: Final Rule (43 CFR Part 414; 64 *Federal Register* 59006, November 1, 1999). Available online at: https://www.usbr.gov/lc/region/g4000/contracts/FinalRule43cfr414.pdf.

[4] ROD for the Colorado River Interim Surplus Guidelines, January 16, 2001 (67 *Federal Register* 7772, January 25, 2001). Available online at: https://www.usbr.gov/lc/region/g4000/surplus/surplus_rod_final.pdf.

[5] ROD for the Operation of Flaming Gorge Dam, February 16, 2006. Available online at: https://www.usbr.gov/uc/envdocs/rod/fgFEIS/final-ROD-15feb06.pdf.

[6] ROD for Navajo Reservoir Operations, Navajo Unit – San Juan River, New Mexico, Colorado, Utah, July 31, 2006. Available online at: https://www.usbr.gov/uc/envdocs/eis/navajo/pdfs/NavWaterOpsROD2006.pdf.

[7] ROD for Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead (73 *Federal Register* 19873, April 11, 2008). The ROD adopting the 2007 Interim Guidelines was signed by the Secretary on December 13, 2007. Available online at: https://www.usbr.gov/lc/region/programs/strategies/RecordofDecision.pdf.

[8] ROD for the Aspinall Unit Operations, Final Environmental Impact Statement, April 2012. Available online at: https://www.usbr.gov/uc/envdocs/eis/AspinallEIS/ROD.pdf.

[9] ROD for the Glen Canyon Dam Long-Term Experimental and Management Plan Final Environmental Impact Statement, December 2016. Available online at: http://ltempeis.anl.gov/documents/docs/LTEMP_ROD.pdf.

[10] IBWC Minute No. 323, Extension of Cooperative Measures and Adoption of a Binational Water Scarcity Contingency Plan in the Colorado River Basin dated September 21, 2017. Available online at: https://www.ibwc.gov/Files/Minutes/Min323.pdf.

[11] The agreements related to the 2019 Colorado River DCPs, as authorized by Public Law 116-14, were executed on May 20, 2019 and consist of an Upper Basin DCP (Drought Response Operations and Demand Management Storage) and a Lower Basin DCP including Lower Basin Drought Operations. Available online at: https://www.usbr.gov/lc/region/programs/dcp.html.

authorized by Public Law 116-14.[12] Each AOP incorporates these and other rules, guidelines, and decisions, and reports on how the criteria contained in the applicable decision document or documents are implemented. Thus, the AOP makes projections and reports on how the Bureau of Reclamation (Reclamation) will implement these decisions in response to changing water supply conditions as they unfold during the upcoming year, when conditions become known. Congress has charged the Secretary of the Interior (Secretary) with stewardship and responsibility for a wide range of natural, cultural, recreational, and tribal resources within the Colorado River Basin. The Secretary has the authority to operate and maintain Reclamation facilities within the Colorado River Basin addressed in this AOP to help manage these resources and accomplish their protection and enhancement in a manner fully consistent with applicable provisions of Federal law including the Law of the River, applicable provisions of State law, and other project-specific operational limitations.

The Secretary recognized in the 2007 Interim Guidelines that the AOP provides an integrated report on reservoir operations affected by numerous federal policies: *"The AOP is used to memorialize operational decisions that are made pursuant to individual federal actions (e.g., ISG* [the 2001 Interim Surplus Guidelines], *1996 Glen Canyon Dam ROD, this* [2007 Interim Guidelines] *ROD). Thus, the AOP serves as a single, integrated reference document required by section 602(b) of the CRBPA of 1968* [Colorado River Basin Project Act of September 30, 1968 (Public Law 90-537)][13] *regarding past and anticipated operations."*

Authority

This 2021 AOP was developed in accordance with the processes set forth in: Section 602 of the CRBPA; the Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs Pursuant to the Colorado River Basin Project Act of September 30, 1968 (Public Law 90-537) (Operating Criteria), as amended, promulgated by the Secretary;[14] and Section 1804(c)(3) of the Grand Canyon Protection Act of 1992 (Public Law 102-575).[15]

Section 602(b) of the CRBPA requires the Secretary to prepare and *"transmit to the Congress and to the Governors of the Colorado River Basin States a report describing the actual operation under the adopted criteria* [i.e., the Operating Criteria] *for the preceding compact water year and the projected operation for the current year."*

This AOP has been developed consistent with: the Operating Criteria; applicable Federal laws; the Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande, the Treaty Between the United States of America and Mexico, signed February 3, 1944 (1944 United States-Mexico Water Treaty);[16] interstate compacts; court decrees; the Colorado River Water

[12] The Colorado River Drought Contingency Plan Authorization Act (Public Law 116-14) was signed into law on April 16, 2019. Available online at: https://www.congress.gov/116/bills/hr2030/BILLS-116hr2030enr.pdf.
[13] Available online at: https://www.usbr.gov/lc/region/pao/pdfiles/crbproj.pdf.
[14] Available online at: https://www.usbr.gov/lc/region/g4000/lroc/frmar2905.pdf.
[15] Available online at: https://www.usbr.gov/uc/legal/gcpa1992.pdf.
[16] Available online at: https://www.ibwc.gov/Files/1944Treaty.pdf.

Delivery Agreement;[17] the 2007 Interim Guidelines; the 2019 Colorado River DCP agreements; and other documents relating to the use of the waters of the Colorado River, which are commonly and collectively known as the Law of the River.

The 2021 AOP was prepared by Reclamation on behalf of the Secretary, working with other Interior agencies and the Western Area Power Administration (WAPA). Reclamation consulted with the seven Colorado River Basin States Governors' representatives, representatives from Mexico, the Upper Colorado River Commission (UCRC), Native American tribes, other appropriate Federal agencies, representatives of academic and scientific communities, environmental organizations, representatives of the recreation industry, water delivery contractors, contractors for the purchase of Federal power, others interested in Colorado River operations, and the general public through the Colorado River Management Work Group.

Article I(2) of the Operating Criteria allows for revision of the projected plan of operation to reflect current hydrologic conditions with notification to the Congress and the Governors of the Colorado River Basin States of any changes by June of each year. The process for revision of the AOP is further described in Section 7.C of the 2007 Interim Guidelines. Any revision to the final AOP may occur only through the AOP consultation process as required by applicable Federal law.

Purpose

The purpose of the AOP is to report on the past year's operations and illustrate the potential range of reservoir operations that might be expected in the upcoming year, and to determine or address: (1) the quantity of water considered necessary to be in storage in the Upper Basin reservoirs as of September 30, 2021, pursuant to Section 602(a) of the CRBPA; (2) water available for delivery pursuant to the 1944 United States-Mexico Water Treaty and Minutes No. 242,[18] 322,[19] and 323 of the IBWC; (3) whether the reasonable consumptive use requirements of mainstream users in the Lower Division States will be met under a "Normal," "Surplus," or "Shortage" Condition as outlined in Article III of the Operating Criteria and as implemented by the 2007 Interim Guidelines; (4) whether management and/or operational regimes will be required or considered as described in the 2019 Colorado River DCP; and (5) whether water apportioned to, but unused by one or more Lower Division States, exists and can be used to satisfy beneficial consumptive use requests of mainstream users in other Lower Division States as provided in the Consolidated Decree of the Supreme Court of the United States in *Arizona v. California*, 547 U.S. 150 (2006) (Consolidated Decree).[20]

[17] Colorado River Water Delivery Agreement: Federal Quantification Settlement Agreement for Purposes of Section 5(B) of Interim Surplus Guidelines, October 10, 2003 (69 *Federal Register* 12202, March 15, 2004). Available online at: https://www.usbr.gov/lc/region/g4000/crwda/crwda.pdf.

[18] IBWC Minute No. 242, Permanent and Definitive Solution to the International Problem of the Salinity of the Colorado River dated August 30, 1973. Available online at: https://www.ibwc.gov/Files/Minutes/Min242.pdf.

[19] IBWC Minute No. 322, Extension of the Temporary Emergency Delivery of Colorado River Water for use in Tijuana, Baja California dated January 19, 2017. Available online at: https://www.ibwc.gov/Files/Minutes/Minute_322_1.pdf.

[20] Available online at: https://www.usbr.gov/lc/region/pao/pdfiles/scconsolidateddecree2006.pdf.

Consistent with the above determinations and in accordance with other applicable provisions of the Law of the River, the AOP was developed with "appropriate consideration of the uses of the reservoirs for all purposes, including flood control, river regulation, beneficial consumptive uses, power production, water quality control, recreation, enhancement of fish and wildlife, and other environmental factors" (Operating Criteria, Article I(2)).

Since the hydrologic conditions of the Colorado River Basin can never be completely known in advance, the AOP presents projected operations resulting from three different hydrologic scenarios: the minimum probable, most probable, and maximum probable reservoir inflow conditions. Projected reservoir operations are modified during the water year as runoff forecasts are adjusted to reflect existing snowpack, basin storage, flow conditions, and as changes occur in projected water deliveries.

Summary of Projected 2021 Operations

Upper Basin. Taking into account (1) the existing water storage conditions in the basin, (2) the August 2020 24-Month Study[21] projection of the most probable near-term water supply conditions in the basin, and (3) Section 6.B of the 2007 Interim Guidelines, the Upper Elevation Balancing Tier will govern the operation of Lake Powell for water year 2021. The August 2020 24-Month Study of the most probable inflow scenario projects the water year 2021 release from Glen Canyon Dam to be 9.00 million acre-feet (maf) (11,100 million cubic meters [mcm]). Given the hydrologic variability of the Colorado River System and based on actual 2020 water year operations, the projected water year release from Lake Powell in 2021 is likely to be in the estimated range of 8.23 maf (10,150 mcm) to 9.00 maf (11,100 mcm) or greater.

For further information about the variability of projected inflow into Lake Powell, see the 2021 Water Supply Assumptions section and the Lake Powell section within the Summary of Reservoir Operations in 2020 and Projected 2021 Reservoir Operations, and Tables 3 and 4.

Lower Basin. Taking into account (1) the existing water storage conditions in the basin, (2) the most probable near-term water supply conditions in the basin, and (3) Section 2.B.5 of the 2007 Interim Guidelines, the Intentionally Created Surplus (ICS) Surplus Condition will govern the operation of Lake Mead for calendar year 2021 in accordance with Article III(3)(b) of the Operating Criteria and Article II(B)(2) of the Consolidated Decree. In addition, the Lower Basin Drought Contingency Plan Agreement (LB DCP Agreement) will also govern the operation of Lake Mead for calendar year 2021. Consistent with Sections III.B.1.a and III.B.2.a of Exhibit 1 to the LB DCP Agreement, DCP contributions will be required by Arizona and Nevada, respectively, in calendar year 2021.

No unused apportionment for calendar year 2021 is anticipated. If any unused apportionment becomes available after adoption of this AOP, Reclamation, on behalf of the Secretary, may

[21] The 24-Month Study refers to the operational study conducted by Reclamation to project future reservoir operations. The most recent 24-Month Study report is available on Reclamation's Water Operations websites and is updated each month. Available online at: https://www.usbr.gov/uc/water/crsp/studies/index.html and https://www.usbr.gov/lc/region/g4000/24mo/index.html.

allocate any such available unused apportionment for calendar year 2021. Any such allocation shall be made in accordance with Article II(B)(6) of the Consolidated Decree, the Lower Colorado Region Policy for Apportioned but Unused Water[22] (Unused Water Policy), and giving further consideration to the water conservation objectives of the July 30, 2014 agreement for a pilot system conservation program (PSCP)[23] and as specified in Section 4.b of the LB DCP Agreement.

In calendar year 2021, Colorado River water may be stored off-stream pursuant to individual Storage and Interstate Release Agreements (SIRAs) and 43 CFR Part 414 within the Lower Division States. The Secretary shall make Intentionally Created Unused Apportionment (ICUA) available to contractors in Arizona, California, or Nevada pursuant to individual SIRAs and 43 CFR Part 414.

The Inadvertent Overrun and Payback Policy (IOPP),[24] which became effective January 1, 2004, will be in effect during calendar year 2021.

Conserved Colorado River water, created through the PSCP[25] and other voluntary agreements, is anticipated to be added to Lower Basin reservoirs pursuant to system conservation agreements in the Lower Basin in calendar year 2021.

The 2007 Interim Guidelines adopted the ICS mechanism, which was expanded upon in the LB DCP Agreement, that among other things encourages the efficient use and management of Colorado River water in the Lower Basin. ICS may be created and delivered in calendar year 2021 pursuant to the 2007 Interim Guidelines, applicable forbearance and delivery agreements, and the LB DCP Agreement.

1944 United States-Mexico Water Treaty. A volume of 1.50 maf (1,850 mcm) of water will be available to be scheduled for delivery to Mexico during calendar year 2021 in accordance with Article 15 of the 1944 United States-Mexico Water Treaty and Minutes No. 242 and 322 of the IBWC. The volume delivered will be adjusted for water savings contributions as required under Section IV of IBWC Minute No. 323. In accordance with IBWC Minute No. 323, Mexico may create water for or take delivery of water from Mexico's Water Reserve pursuant to Section V of IBWC Minute No. 323.

[22] Lower Colorado Region Policy for Apportioned but Unused Water, February 11, 2010. Available online at: https://www.usbr.gov/lc/region/g4000/UnusedWaterPolicy.pdf.
[23] Available online at: https://www.usbr.gov/lc/region/programs/PilotSysConsProg/PilotSCPFundingAgreement7-30-2014.pdf.
[24] ROD for Implementation Agreement, Inadvertent Overrun and Payback Policy, and Related Federal Actions, Final Environmental Impact Statement, October 10, 2003 (69 *Federal Register* 12202, March 15, 2004). Available online at: https://www.usbr.gov/lc/region/g4000/crwda/crwda_rod.pdf.
[25] More information about the PSCP in the Lower Basin can be found at: https://www.usbr.gov/lc/region/programs/PilotSysConsProg/pilotsystem.html.

2020 HYDROLOGY SUMMARY AND RESERVOIR STATUS

Below average stream flows were observed throughout much of the Colorado River Basin during water year 2020. Unregulated[26] inflow to Lake Powell in water year 2020 was 5.85 maf (7,220 mcm), or 54 percent of the 30-year average[27] which is 10.83 maf (13,360 mcm). Unregulated inflow to Flaming Gorge, Blue Mesa, and Navajo Reservoirs was 86, 64, and 40 percent of average, respectively.

Precipitation in the Upper Colorado River Basin was below average[28] during water year 2020. On September 30, 2020, the cumulative precipitation received within the Upper Colorado River Basin for water year 2020 was 77 percent of average.

Snowpack conditions trended near average[29] across most of the Colorado River Basin throughout the snow accumulation season. The basin-wide snow water equivalent measured 107 percent of median on April 1, 2020, which is the same date the total seasonal accumulation peaked. On April 1, 2020, the snow water equivalents for the Green River, Upper Colorado River Headwaters, and San Juan River Basins were 110, 115, and 96 percent of median, respectively.

During the 2020 spring runoff period, inflows to Lake Powell peaked on June 5, 2020 at approximately 42,500 cubic feet per second (cfs) (1,200 cubic meters per second [cms]). The April through July unregulated inflow volume for Lake Powell was 3.76 maf (4,640 mcm) which was 52 percent of average.

Lower Basin tributary inflows above Lake Mead were below average for water year 2020. Tributary inflow measured at the Little Colorado River near Cameron gage for water year 2020 totaled 0.092 maf (113 mcm), or 64 percent of average. Tributary inflow measured at the Virgin River at Littlefield gage for water year 2020 totaled 0.138 maf (170 mcm), or 76 percent of average.

Below Hoover Dam, tributary inflow for water year 2020 measured at the Bill Williams River below Alamo Dam gage totaled 0.083 maf (102 mcm), and tributary inflow measured at the Gila River near Dome gage totaled 0.0070 maf (9.0 mcm).[30]

The Colorado River total system storage experienced a net decrease of 2.75 maf (3,390 mcm) in water year 2020. Reservoir storage in Lake Powell decreased during water year 2020 by

[26] Unregulated inflow adjusts for the effects of operations at upstream reservoirs. It is computed by adding the change in storage and the evaporation losses from upstream reservoirs to the observed inflow. Unregulated inflow is used because it provides an inflow time series that is not biased by upstream reservoir operations.
[27] Inflow statistics throughout this document will be compared to the mean of the 30-year period 1981-2010, unless otherwise noted.
[28] Precipitation statistics throughout this document are provided by the National Weather Service's Colorado Basin River Forecast Center and are based on the mean for the 30-year period 1981-2010, unless otherwise noted.
[29] Snowpack and snow water equivalent statistics throughout this document are provided by the Natural Resources Conservation Service and are based on the median for the 30-year period 1981-2010, unless otherwise noted.
[30] Tributary inflows from the Bill Williams River and Gila River to the mainstream are very sporadic. These flows occur very seldom and when they do they are typically of high magnitude.

1.91 maf (2,360 mcm). Reservoir storage in Lake Mead increased during water year 2020 by 0.018 maf (22 mcm). At the beginning of water year 2020 (October 1, 2019), Colorado River total system storage was 53 percent of capacity. As of September 30, 2020, total system storage was 48 percent of capacity.

Tables 1 and 2 list the October 1, 2020, reservoir vacant space, live storage, water elevation, percent of capacity, change in storage, and change in water elevation during water year 2020.

Table 1. Reservoir Conditions on October 1, 2020 (English Units)

Reservoir	Vacant Space	Live Storage	Water Elevation	Percent of Capacity	Change in Storage*	Change in Elevation*
	(maf)	(maf)	(ft)	(%)	(maf)	(ft)
Fontenelle	0.087	0.258	6,494.55	75	-0.013	-1.8
Flaming Gorge	0.555	3.19	6,025.93	85	-0.215	-5.6
Blue Mesa	0.390	0.439	7,470.42	53	-0.297	-38.4
Navajo	0.546	1.15	6,043.32	68	-0.239	-19.8
Lake Powell	12.95	11.37	3,595.98	47	-1.91	-19.4
Lake Mead	15.84	10.28	1,083.21	39	0.018	0.2
Lake Mohave	0.285	1.52	636.50	84	-0.049	-1.9
Lake Havasu	0.066	0.554	446.61	89	-0.046	-2.4
Totals	30.72	28.77		48	-2.75	

* From October 1, 2019, to September 30, 2020.

Table 2. Reservoir Conditions on October 1, 2020 (Metric Units)

Reservoir	Vacant Space	Live Storage	Water Elevation	Percent of Capacity	Change in Storage*	Change in Elevation*
	(mcm)	(mcm)	(m)	(%)	(mcm)	(m)
Fontenelle	107	318	1,979.54	75	-16	-0.5
Flaming Gorge	685	3,930	1,836.70	85	-265	-1.7
Blue Mesa	481	541	2,276.98	53	-366	-11.7
Navajo	673	1,420	1,842.00	68	-295	-6.0
Lake Powell	15,970	14,020	1,096.05	47	-2,360	-5.9
Lake Mead	19,540	12,680	330.16	39	22	0.1
Lake Mohave	352	1,870	194.00	84	-60	-0.6
Lake Havasu	81	683	136.13	89	-57	-0.7
Totals	37,890	35,490		48	-3,390	

* From October 1, 2019, to September 30, 2020.

2021 WATER SUPPLY ASSUMPTIONS

For 2021 operations, three reservoir unregulated inflow scenarios were developed and analyzed: minimum probable, most probable, and maximum probable.

There is considerable uncertainty associated with streamflow forecasts and projections of reservoir operations made a year in advance. The National Weather Service's Colorado Basin River Forecast Center (CBRFC) forecasts the inflow for the minimum probable (90 percent exceedance), most probable (50 percent exceedance), and maximum probable (10 percent exceedance) inflow scenarios using an Ensemble Streamflow Prediction model. Based upon the August CBRFC forecast, the range of unregulated inflows is projected to be as follows:

- The forecasted minimum probable unregulated inflow to Lake Powell in water year 2021 is 5.20 maf (6,410 mcm), or 48 percent of average.
- The forecasted most probable unregulated inflow to Lake Powell in water year 2021 is 8.70 maf (10,730 mcm), or 80 percent of average.
- The forecasted maximum probable unregulated inflow to Lake Powell in water year 2021 is 16.50 maf (20,350 mcm), or 152 percent of average.

Projected unregulated inflow volumes into Lake Powell for specific time periods for these three forecasted inflow scenarios are shown in Tables 3 and 4.

Inflows to the mainstream from Lake Powell to Lake Mead, Lake Mead to Lake Mohave, Lake Mohave to Lake Havasu, and below Lake Havasu are projected using historic data over the five-year period of January 2015 through December 2019, inclusive. These five years of historic data are representative of the most recent hydrologic conditions in the Lower Basin. The most probable side inflows into each reach are estimated as the arithmetic mean of the five-year record. The maximum probable and minimum probable projections for each reach are the 10 percent and 90 percent exceedance values, respectively, of the five-year record. For the reach from Lake Powell to Lake Mead, the minimum probable inflow during water year 2021 is 0.766 maf (945 mcm), the most probable inflow is 0.878 maf (1,080 mcm), and the maximum probable inflow is 1.04 maf (1,280 mcm).

The projected monthly volumes of inflow were input into the 24-Month Study and used to project potential reservoir operations for 2021. Starting with the August 2020 24-Month Study projection of the October 1, 2021 reservoir storage conditions, the projected monthly releases for each reservoir were adjusted until release and storage levels best accomplished project purposes and applicable operational objectives.

For the latest monthly projections for the major reservoirs in the Colorado River system, please see the most recent 24-Month Study report available on these Reclamation websites: https://www.usbr.gov/uc/water/crsp/studies/index.html, or https://www.usbr.gov/lc/region/g4000/24mo/index.html.

Table 3. Projected Unregulated Inflow into Lake Powell for Water Year 2021 (English Units)[31]

Time Period	Minimum Probable (maf)	Most Probable (maf)	Maximum Probable (maf)
10/2020 – 12/2020	1.07	1.13	1.41
1/2021 – 3/2021	1.12	1.12	1.71
4/2021 – 7/2021	2.70	5.74	11.91
8/2021 – 9/2021	0.31	0.71	1.46
10/2021 – 12/2021	1.03	1.25	1.71
WY 2021	5.20	8.70	16.49
CY 2021	5.16	8.82	16.79

Table 4. Projected Unregulated Inflow into Lake Powell for Water Year 2021 (Metric Units)

Time Period	Minimum Probable (mcm)	Most Probable (mcm)	Maximum Probable (mcm)
10/2020 – 12/2020	1,320	1,390	1,740
1/2021 – 3/2021	1,380	1,380	2,110
4/2021 – 7/2021	3,330	7,080	14,690
8/2021 – 9/2021	380	880	1,800
10/2021 – 12/2021	1,270	1,540	2,110
WY 2021	6,410	10,730	20,340
CY 2021	6,360	10,880	20,710

[31] All values in Tables 3 and 4 are projected inflows based upon the August 2020 CBRFC forecast. The CBRFC Most Probable forecast is issued as monthly values. The CBRFC Minimum and Maximum Probable forecasts are issued as water year totals, which Reclamation disaggregates to monthly values using monthly proportions of the 10th and 90th percentiles, respectively, of the 1981-2010 unregulated inflow.

SUMMARY OF RESERVOIR OPERATIONS IN 2020 AND PROJECTED 2021 RESERVOIR OPERATIONS

The operation of the Colorado River reservoirs has affected some aquatic and riparian resources. Controlled releases from dams have modified temperature, sediment load, and flow patterns, resulting in increased productivity of some riparian and non-native aquatic resources and the development of economically significant sport fisheries. However, these same releases can have detrimental effects on endangered and other native species. Operating strategies designed to protect and enhance aquatic and riparian resources have been established after appropriate National Environmental Policy Act compliance at several locations in the Colorado River Basin.

In the Upper Basin, public stakeholder work groups have been established at Fontenelle Dam, Flaming Gorge Dam, the Aspinall Unit, and Navajo Dam. These work groups provide a public forum for dissemination of information regarding ongoing and projected reservoir operations throughout the year and allow stakeholders the opportunity to provide information and feedback with respect to ongoing reservoir operations. Additionally, the Glen Canyon Dam Adaptive Management Work Group (AMWG)[32] was established in 1997 as a chartered committee under the Federal Advisory Committee Act of 1972 (Public Law 92-463).

Modifications to projected operations are routinely made based on changes in forecasted conditions or other relevant factors. Within the parameters set forth in the Law of the River and consistent with the Upper Colorado River Endangered Fish Recovery Program (UCRIP),[33] the San Juan River Basin Recovery Implementation Program (SJRIP),[34] Section 7 consultations under the Endangered Species Act, and other downstream concerns, modifications to projected monthly operations may be based on other factors in addition to changes in streamflow forecasts. Decisions on spring peak releases and downstream habitat target flows may be made midway through the runoff season. Reclamation will conduct meetings with Recovery Program participants, the U.S. Fish and Wildlife Service (Service), other Federal agencies, representatives of the Basin States, and with public stakeholder work groups to facilitate the discussions necessary to finalize site-specific projected operations.

The following paragraphs discuss reservoir operations in 2020 and the range of probable projected 2021 operations of each of the reservoirs with respect to applicable provisions of compacts, the Consolidated Decree, statutes, regulations, contracts, and instream flow needs for maintaining or improving aquatic and riparian resources where appropriate.

[32] Information on the AMWG can be found at: https://www.usbr.gov/uc/progact/amp/amwg.html.
[33] Information on the UCRIP can be found at: http://coloradoriverrecovery.org.
[34] Information on the SJRIP can be found at: https://www.fws.gov/southwest/sjrip.

Fontenelle Reservoir

Reservoir storage in Fontenelle decreased during water year 2020. At the beginning of water year 2020, Fontenelle storage was 79 percent of live capacity at elevation 6,496.36 feet (1,980.09 meters), with 0.271 maf (334 mcm) in storage. The unregulated inflow to Fontenelle during water year 2020 was 0.996 maf (1,230 mcm) which is 92 percent of average. At the end of the water year, September 30, 2020, Fontenelle storage was at 75 percent of live capacity at elevation 6,494.55 feet (1,979.54 meters), with a storage of 0.258 maf (318 mcm) resulting in a net decrease during water year 2020 of 0.013 maf (16 mcm).

Hydrologic conditions in the Upper Green River Basin above Fontenelle were below average in water year 2020. Snowpack development tracked above median with average fall conditions maintaining soil moisture resulting in near average runoff forecasts. Peak snow water equivalent reached 116 percent of seasonal median on April 18, 2020. The observed inflow during the April to July season was 0.677 maf (835 mcm), or 93 percent of average.

Fontenelle Reservoir filled in water year 2020. The reservoir elevation peaked at 6,504.20 feet (1,982.48 meters) on July 18, 2020, which was 2.40 feet (0.73 meters) below the spillway crest. Daily inflow peaked at 9,140 cfs (259 cms) on June 9, 2020. Reservoir releases were made to balance downstream water resources needs and power production, while also allowing for filling the reservoir to maintain sufficient water in storage for use through the fall and winter months. Releases peaked at 4,060 cfs (115 cms) on June 16, 2020 and were reduced to 900 cfs (25.5 cms) in September.

Based on the August 2020 24-Month Study, the most probable April through July inflow scenario for Fontenelle Reservoir during water year 2021 is 0.645 maf (796 mcm) or 89 percent of average. This volume exceeds the 0.295 maf (364 mcm) storage capacity of Fontenelle Reservoir. For this reason, the most probable and maximum probable inflow scenarios would require releases during the spring that exceed the capacity of the powerplant to avoid uncontrolled spills from the reservoir. It is likely that Fontenelle Reservoir will fill during water year 2021. In order to minimize high spring releases and to maximize downstream water resources and power production, the reservoir will most likely be drawn down to about elevation 6,468.35 feet (1,971.55 meters) by early March 2021, which is 5.35 feet (1.63 meters) above the minimum operating level for power generation, and corresponds to a volume of 0.112 maf (138 mcm) of live storage.

Flaming Gorge Reservoir

Reservoir storage in Flaming Gorge decreased during water year 2020. At the beginning of water year 2020, Flaming Gorge storage was 91 percent of live capacity at elevation 6,031.57 feet (1,838.42 meters), with 3.41 maf (4,210 mcm) in storage. The unregulated inflow to Flaming Gorge during water year 2020 was 1.25 maf (1,540 mcm) which is 86 percent of average. At the end of the water year, Flaming Gorge storage was at 85 percent of live capacity at elevation 6,025.93 feet (1,836.70 meters), with 3.19 maf (3,930 mcm) resulting in a net decrease during water year 2020 of 0.215 maf (265 mcm).

Flaming Gorge Dam operations in 2020 were conducted in compliance with the 2006 Flaming Gorge ROD. Reclamation convened the Flaming Gorge Technical Working Group (FGTWG) comprised of Service, WAPA, and Reclamation personnel. The FGTWG proposed that Reclamation manage releases to the Green River to meet the commitments of the 2006 Flaming Gorge ROD and, to the extent possible, meet the experimental design parameters outlined in the UCRIP Larval Trigger Study Plan (LTSP) for the benefit of endangered razorback sucker.[35] Larvae were detected on May 19, 2020. After public notification, releases from Flaming Gorge Dam were increased to full powerplant capacity on May 26, 2020. Bypass releases were utilized to bring the total release from Flaming Gorge Dam to 8,600 cfs (243 cms) for 4 days, starting on May 27, 2020, to enhance floodplain operations in the middle Green River for the benefit of endangered species.

In total, Flaming Gorge Dam released at or above powerplant capacity releases of 4,600 cfs (130 cms) for 13 days during the April through July runoff period. Yampa River flows at the Deerlodge gage during the LTSP peaked at 11,400 cfs (323 cms) on June 3, 2020. The peak release from Flaming Gorge Dam occurred before the Yampa River peak to support larval entrainment and reservoir management during the high spring inflows. Flows measured on the Green River at the Jensen, Utah gage reached levels at or above 14,000 cfs (396 cms) for 12 days between May 29 and June 9, 2020 with a peak of 17,600 cfs (498 cms) on June 4, 2020. The LTSP target for this hydrologic classification is greater than or equal to 14,000 cfs (396 cms) and a peak magnitude of up to 18,600 cfs (526 cms) for 7 or more days.

Hydrologic conditions in the Upper Green River Basin above Flaming Gorge were below average in water year 2020 even though snowpack development tracked just above median with average fall conditions maintaining soil moisture resulting in near average runoff forecasts. Peak snow water equivalent reached 113 percent of seasonal median on April 18, 2020. The May forecast for the April through July inflow into Flaming Gorge Reservoir was 0.880 maf (1,090 mcm), or 85 percent of average. The observed inflow during the April to July season was 0.833 maf (1,030 mcm), or 85 percent of average.

Observed flow volumes from the Yampa River Basin were significantly different than projected flow volumes from the Upper Green River Basin and fell into the average hydrologic condition. The 2006 Flaming Gorge ROD hydrologic classification for the Upper Green was characterized as average. The flexibility in the ROD allows for a change in hydrology classification two higher and one lower than that designated by the forecasted unregulated inflow volume on May 1 depending upon Yampa River conditions. It was determined that the hydrologic classification was average and the LTSP hydrologic classification was average (below median) based on the May forecast. Flows at Jensen met 2006 Flaming Gorge ROD flow targets in Reach 2 for the ROD Flow Recommendation of at least 14,000 cfs (396 cms) for 12 days.

Consistent with the 2006 Flaming Gorge ROD, considering information provided to the FGTWG, average hydrologic conditions and in response to the Recovery Program's request, Reclamation operated Flaming Gorge Dam to produce flows in Reach 2 to assist in the

[35] The LTSP's primary objective is to determine the effects of timing of Flaming Gorge spring release on razorback sucker larvae in the reach below the confluence of the Green and Yampa Rivers. The LTSP Report is available online at: https://www.usbr.gov/uc/water/crsp/wg/fg/twg/twgSummaries.html.

recovery of Colorado Pikeminnow during the summer of 2020. The 2006 Flaming Gorge ROD base flow period hydrologic classification was average as of July 2020. The August observed unregulated inflow resulted in a Moderate Dry hydrologic classification. Daily base flows fluctuated during the summer to meet 2,000 to 2,600 cfs (56.6 to 73.6 cms) in July and August and 1,800 to 2,000 cfs (51.0 to 60.6 cms) in September on the Green River at Jensen, Utah ~~through September 30, 2020~~.

The Flaming Gorge Operation Plan for May 2020 through April 2021 (FG-Ops) has been developed and approved by Reclamation. The FG-Ops outlines the UCRIP request that includes the LTSP[36] experiments for the razorback sucker (spring peak period), and Colorado pikeminnow[37] proposed flows within the confines of the 2000 Flow and Temperature Recommendations (summer base flow period). The FG-Ops includes a plan release schedule for moderately dry, average (below and above median) and moderately wet scenarios for the spring peak flows, summer-autumn base flows, and winter base flow periods. The summer-autumn and winter base flows periods followed the 2000 Flow and Temperature Recommendations.[38]

Under the August 2020 most probable inflow scenario, winter base flow releases are projected to be in the average classification range with a 25 percent increase above the average daily base flows calculated through the base flow period. Winter releases are projected to be approximately 1,150 cfs (32.5 cms). Daily base flows will likely fluctuate during the winter in response to hydropower needs during December through February and meet the average-year reservoir upper level drawdown elevation target of 6,027.00 feet (1,837.03 meters) by May 1, 2021. A spring peak release is projected to occur in May or June 2021 and will be timed to coincide with either the peak flows of the Yampa River or emergence of razorback sucker larvae. Reclamation is considering long-term implementation strategies for the Recovery Program LTSP.

Based on the August 2020 24-Month Study, the most probable April through July unregulated inflow scenario for Flaming Gorge Reservoir during water year 2021 is 0.845 maf (1,040 mcm) or 86 percent of average. The peak elevation is expected to be approximately 6,029.63 feet (1,837.83 meters) near mid-July 2021. By the end of water year 2021, Flaming Gorge Reservoir is projected to be at elevation 6,028.19 feet (1,837.39 meters), with a storage of 3.28 maf (4,050 mcm), or 87 percent of capacity.

The UCRIP, in coordination with Reclamation, the Service, and WAPA, will continue conducting studies associated with floodplain inundation. Such studies may result in

[36] Available online at: http://www.coloradoriverrecovery.org/documents-publications/technical-reports/isf/BestgenHillFR-BWtopoGreenRiverpikeminnowreportFinalFebruary2016.pdf.

[37] Colorado pikeminnow study does not have an approved study plan, and is implemented within the confines of 2000 Flow and Temperature. Bestgen, K.R. and A. Hill. 2016. Reproduction, abundance, and recruitment dynamics of young Colorado pikeminnow in the Green and Yampa rivers, Utah and Colorado, 1979-2012. Larval Fish Laboratory Contribution 183. https://www.coloradoriverrecovery.org/documents-publications/technical-reports/isf/BestgenHillFR-BWtopoGreenRiverpikeminnowreportFinalFebruary2016.pdf

[38] Flow and Temperature Recommendations for Endangered Fishes in the Green River Downstream of Flaming Gorge Dam, September 2000. Available online at: http://www.coloradoriverrecovery.org/documents-publications/technical-reports/isf/flaminggorgeflowrecs.pdf.

alternatives for meeting flow and temperature recommendations at lower peak flow levels where feasible.

Blue Mesa, Morrow Point, and Crystal Reservoirs (Aspinall Unit)

Reservoir storage content in Blue Mesa decreased during water year 2020. At the beginning of water year 2020, Blue Mesa storage content was 89 percent of live capacity at elevation 7,508.84 feet (2,288.69 meters), with 0.736 maf (908 mcm) in storage content. The unregulated inflow to Blue Mesa during water year 2020 was 0.608 maf (750 mcm) which was 64 percent of average. At the end of the water year, Blue Mesa storage content was 53 percent of live capacity at elevation 7,470.42 feet (2,276.98 meters), with 0.439 maf (541 mcm) resulting in a net decrease during water year 2020 of 0.297 maf (366 mcm).

Near average snowpack conditions occurred during the winter months of water year 2020 in the Gunnison River Basin. Snow measurement sites in the basin reported near average seasonal snow water equivalent levels throughout the winter and into the spring of 2020 resulting in an April 1, 2020 snow water equivalent for the Gunnison River Basin that was 97 percent of average.

The fall through winter releases from Crystal Dam varied between approximately 1,450 cfs (41.0 cms) in November 2019 to 600 cfs (17.0 cms) in February 2020. On March 19, 2020, releases from Crystal Dam were increased for operation of the Gunnison Tunnel. Flows through the Black Canyon were maintained within the range of approximately 450 cfs (12.7 cms) to approximately 1,412 cfs (40.0 cms) until May 15, 2020.

The May 2020 final forecast for the unregulated inflow to Blue Mesa for the April through July runoff period was 0.450 maf (555 mcm) which was 67 percent of average. This forecast was used to establish the hydrologic category for water year 2020 as Moderately Dry with a peak flow target established for the Whitewater reach of the Gunnison River of 5,396 cfs (153 cms) for 1 day.

On May 15, 2020, releases from Crystal, Morrow Point and Blue Mesa were increased to target downstream flow levels and durations described in the Aspinall ROD and the Black Canyon Water Right Decree.[39] On May 18, 2020, while releases from Aspinall were being increased to meet the downstream peak flow target, the mid-month forecast was issued and the April through July unregulated inflow forecast for Blue Mesa was reduced to 0.395 maf (487 mcm) which was 59 percent of average. Based on the updated forecast the peak flow target was reduced to 3,167 cfs (89.6 cms) for 1 day. During spring peak operations, flows measured in the Whitewater Reach of the Gunnison River achieved an average daily peak flow of 4,510 cfs (128 cms) on May 20, 2020. Releases from Crystal Dam on May 20, 2020 resulted in a 24-hour average peak flow through the Black Canyon and the Gunnison River Gorge of 2,840 cfs (80.4 cms) as measured at the streamgage located on the Gunnison River below the Gunnison Tunnel. Gunnison River flows in the Black Canyon met or exceeded the flows described in the Black Canyon Water Right Decree.

[39] Decree quantifying the Federal Reserved Water Right for Black Canyon of the Gunnison National Park (State of Colorado District Court, Water Division Four, Case Number 01CW05), signed on December 31, 2008.

For water year 2021, the Aspinall Unit will be operated in compliance with the 2012 Aspinall ROD, including all required consultations and consistent with applicable law, while maintaining and continuing to meet its Congressionally-authorized purposes.

Based on the August 2020 24-Month Study, the projected most probable unregulated inflow for water year 2021 into Blue Mesa Reservoir is 0.820 maf (1,010 mcm), or 86 percent of average. The reservoir is expected to reach a seasonal low elevation of 7,470.55 feet (2,277.02 meters) by February 2021. The peak elevation is expected to be approximately 7,506.61 feet (2,288.01 meters) near the end of July 2021. By the end of water year 2021, Blue Mesa Reservoir is projected to be at elevation 7,500.02 feet (2,286.01 meters), with a storage content of 0.662 maf (817 mcm), or 80 percent of capacity.

Navajo Reservoir

Storage in Navajo Reservoir decreased during water year 2020. At the beginning of water year 2020, Navajo storage was 81 percent of live capacity at elevation 6,063.01 feet (1,848.01 meters), with 1.39 maf (1,710 mcm) in storage. The modified unregulated inflow[40] to Navajo during water year 2020 was 0.431 maf (532 mcm) which is 40 percent of average. At the end of the water year, Navajo storage was at 68 percent of live capacity at elevation 6,043.32 feet (1,842.00 meters), with 1.15 maf (1,420 mcm) resulting in a net decrease during water year 2020 of 0.239 maf (295 mcm).

Reservoir storage in Navajo decreased throughout water year 2020 peaking at an elevation of 6,062.60 feet (1,847.88 meters) on June 7, 2020. This was 22.40 feet (6.83 meters) below full pool. The April through July modified unregulated inflow into Navajo Reservoir in water year 2020 was 0.348 maf (429 mcm), or 47 percent of average.

The San Juan Flow Recommendations,[41] completed by the SJRIP in May 1999, provide flow recommendations that promote the recovery of the endangered Colorado pikeminnow and razorback sucker, maintain important habitat for these two species as well as the other native species, and provide information for the evaluation of continued water development in the basin. In water year 2020, Navajo Reservoir operated under the SJRIP and Reclamation's interim operations. Under the interim operations, releases for SJRIP recovery purposes are dependent on annual hydrology and available water may be released as a spring peak release, an augmentation of existing target base flows, or for some other SJRIP purposes. The interim operations specify that the reservoir releases will be calculated to target an End of Water Year Storage Target elevation of 6,063.00 feet (1,848.00 meters). The interim operations also specify a minimum elevation of 6,050.00 feet (1,844.04 meters) for the purposes of calculating water available to release as a spring peak release. All available water over this target, minus the water required for minimum releases and contracts, will be available to be released as a

[40] Modified unregulated inflow into Navajo Reservoir is calculated as the observed inflow adjusted for the San Juan Chama diversions and change in storage at Vallecito Reservoir.
[41] Flow Recommendations for the San Juan River, May 1999. Available online at: https://www.fws.gov/southwest/sjrip/pdf/DOC_Flow_recommendations_San_Juan_River.pdf.

spring peak hydrograph if the SJRIP requests. The available water must equate to at least 21 days at 5,000 cfs (142 cms) to be released.

Navajo Reservoir was operated in compliance with the 2006 Navajo Reservoir ROD in 2020, including the SJRIP's target base flows. Compliance with the target base flow was calculated using the weekly average of gaged flows throughout the critical habitat area from Farmington to Lake Powell. Based on the SJRIP and Reclamation's interim operations for water year 2020, there was no spring peak release at Navajo Reservoir.

During water year 2021, Navajo Reservoir will be operated in accordance with the 2006 Navajo Reservoir ROD. Navajo Reservoir storage levels are expected to be below average in 2021 under the most probable inflow forecast. Base releases from the reservoir will likely range from 250 cfs (7.1 cms) to 600 cfs (17.0 cms) through the winter. Based on the October 2020 most probable April through July modified unregulated inflow forecast of 0.505 maf (623 mcm) in 2021, the October 2020 24-Month Study projects no spring peak release would be recommended by the SJRIP and Reclamation's interim operations for water year 2021. The reservoir is projected to reach a peak elevation of 6,056.77 feet (1,846.10 meters) in June 2021. The reservoir is projected to reach a minimum elevation of 6,039.25 feet (1,840.76 meters) in February 2021.

Under the minimum probable 2021 April through July inflow forecast of 0.276 maf (341 mcm), there will be no spring peak release during the spring of 2021. Under the maximum probable 2021 April through July inflow forecast of 1.010 maf (1,250 mcm), a 60-day spring peak release will be recommended as described by the anticipated SJRIP and Reclamation's interim operations for water year 2021.

In 2016, a four-year agreement on recommendations for San Juan River operations and administration was developed among major users to limit their water use in years 2017-2020 to the rates and volumes indicated in the agreement. The agreement includes limitations on diversions for 2017-2020, criteria for determining a shortage, and shortage-sharing requirements in the event of a water supply shortfall, including sharing of shortages between the water users and the flows for endangered fish habitat. This agreement has received endorsements from all participating parties, as well as the final signature from the New Mexico State Engineer's office.

Lake Powell

Reservoir storage in Lake Powell decreased during water year 2020. At the beginning of water year 2020, Lake Powell storage was 55 percent of live capacity at elevation 3,615.36 feet (1,101.96 meters), with 13.28 maf (16,380 mcm) in storage. The unregulated inflow to Lake Powell during water year 2020 was 5.85 maf (7,220 mcm) which is 54 percent of average. At the end of the water year, Lake Powell storage was at 47 percent of live capacity at elevation 3,595.98 feet (1,096.05 meters), with 11.37 maf (14,020 mcm) resulting in a net decrease during water year 2020 of 1.91 maf (2,360 mcm).

The August 2019 24-Month Study was run to project the January 1, 2020, elevations of Lake Powell and Lake Mead and determine the water year 2020 operating tier for Lake Powell.

Using the most probable inflow scenario, and with an 8.23 maf (10,150 mcm) annual release pattern for Lake Powell, the January 1, 2020, reservoir elevations of Lake Powell and Lake Mead were projected to be 3,618.56 feet (1,102.94 meters) and 1,089.40 feet (332.05 meters), respectively. Given these projections, the annual release volume from Lake Powell during water year 2020 was consistent with the Upper Elevation Balancing Tier (Section 6.B of the 2007 Interim Guidelines) and under Section 6.B.1, the annual release would be 8.23 maf (10,150 mcm).

The Upper Elevation Balancing Tier provides for the possibility of adjustments to the operation of Lake Powell based on the projected end of water year condition of Lake Powell and Lake Mead from the April 24-Month Study. The April 2020 24-Month Study was run with an 8.23 maf (10,150 mcm) annual release volume to project the September 30, 2020, elevations of Lake Powell and Lake Mead. Under the most probable inflow scenario, and with an 8.23 maf (10,150 mcm) annual release volume, the projected end of water year elevation at Lake Powell was 3,614.87 feet (1,101.81 meters) and Lake Mead was 1,084.17 feet (330.46 meters). Since the projected end of water year elevation at Lake Powell was below the 2020 Equalization elevation of 3,657.00 feet (1,114.65 meters) and above 3,575.00 feet (1,089.66 meters) and the projected Lake Mead elevation was above 1,075.00 feet (327.66 meters), Section 6.B.1 of the 2007 Interim Guidelines governed for the remainder of water year 2020. Under Section 6.B.1, the Secretary shall release 8.23 maf (10,150 mcm) from Lake Powell. The annual release volume during water year 2020 was 8.23 maf (10,150 mcm).

The April through July unregulated inflow to Lake Powell in water year 2020 was 3.76 maf (4,640 mcm) which was 52 percent of average. During the 2020 April through July runoff period, Lake Powell's water surface elevation peaked on June 22, 2020,at 3,611.02 feet (1,100.64 meters), which was 88.98 feet (27.12 meters) below full pool. This elevation corresponds to a live storage content of 12.83 maf (15,830 mcm).

In water year 2020, Glen Canyon Dam was operated in compliance with the LTEMP ROD. The third Macroinvertebrate Production Flow (bug flow) experiment under the LTEMP was designed and conducted during May through August 2020. During these experiments, releases were held steady during Saturday and Sunday in an attempt to increase production of aquatic insects. The total annual release from Glen Canyon Dam in water year 2020 did not change as a result of the experimental releases.

The ten-year total flow of the Colorado River at Lee Ferry[42] for water years 2011 through 2020 is 92.50 maf (114,100 mcm). This total is computed as the sum of the flow of the Colorado River at Lees Ferry Arizona, and the Paria River at Lees Ferry, Arizona, surface water discharge stations which are operated and maintained by the United States Geological Survey.

2021 Operating Tier and Projected Operations for Glen Canyon Dam. The January 1, 2021 reservoir elevations of Lake Powell and Lake Mead are projected under the most probable inflow scenario to be 3,591.60 feet (1,094.72 meters) and 1,085.28 feet (330.79 meters), respectively, based on the August 2020 24-Month Study. Given these projections, the operating tier and annual release volume from Lake Powell during water year 2021 will be

[42] A point in the mainstream of the Colorado River one mile below the mouth of the Paria River.

consistent with the Upper Elevation Balancing Tier (Section 6.B of the 2007 Interim Guidelines) and, under Section 6.B.1, the annual release would be 8.23 maf (10,150 mcm). The Upper Elevation Balancing Tier provides for the possibility of adjustments to the operation of Lake Powell based on the projected end of water year conditions of Lake Powell and Lake Mead from the April 24-Month Study.

If the April 2021 24-Month Study, with a water year release volume of 8.23 maf (10,150 mcm) projects the September 30, 2021, Lake Powell elevation to be greater than 3,659.00 feet (1,115.26 meters), operations will be adjusted and the Equalization Tier will govern the operation of Lake Powell for the remainder of the water year consistent with Section 6.B.3. If this condition occurs, and an adjustment is made, the water year release volume will likely be greater than 8.23 maf (10,150 mcm) and will be determined based on the Equalization Tier as described in Section 6.A of the 2007 Interim Guidelines.

If the April 2021 24-Month Study, with a water year release volume of 8.23 maf (10,150 mcm), projects the September 30, 2021, Lake Powell elevation to be at or above 3,575.00 feet (1,089.66 meters) and below the 2021 Equalization level of 3,659.00 feet (1,115.26 meters), and the September 30, 2021, Lake Mead elevation to be below 1,075.00 feet (327.66 meters), the Secretary shall balance the contents of Lake Mead and Lake Powell, but shall release not more than 9.00 maf (11,100 mcm) and not less than 8.23 maf (10,150 mcm) from Lake Powell in water year 2021 consistent with Section 6.B.4 of the 2007 Interim Guidelines.

Under the minimum probable inflow scenario, the August 2020 24-Month Study, with a projected water year release volume of 8.23 maf (10,150 mcm) in water year 2021, projects that the elevations of Lake Powell and Lake Mead on September 30, 2021, would be 3,567.54 feet (1,087.39 meters) and 1,069.22 feet (325.90 meters), respectively. Based on these projections, there would be no April adjustment to Lake Powell operations under the minimum probable inflow scenario and the water year release for 2021 is projected to be 8.23 maf (10,150 mcm).

Under the most probable inflow scenario, the August 2020 24-Month Study, with a projected water year release volume of 8.23 maf (10,150 mcm) in water year 2021, projects that the elevations of Lake Powell and Lake Mead on September 30, 2021, would be 3,595.30 feet (1,095.85 meters) and 1,073.82 feet (327.30 meters), respectively. Based on these projections, under the most probable inflow scenario, an April adjustment to balancing is projected to occur during water year 2021. Consistent with Section 6.B.4, the 2021 water year release volume projected under the most probable inflow scenario is 9.00 maf (11,100 mcm) and the end of water year elevation and storage of Lake Powell is projected to be 3,587.57 feet (1,093.49 meters) and 10.60 maf (13,070 mcm), respectively.

Under the maximum probable inflow scenario, the August 2020 24-Month Study, with a projected water year release volume of 8.23 maf (10,150 mcm) in water year 2021, projects that the elevation of Lake Powell and Lake Mead on September 30, 2021, would be 3,656.19 feet (1,114.41 meters) and 1,077.95 feet (328.56 meters), respectively. Based on this projection there would be no adjustment to Powell operations under the maximum probable inflow scenario and the water year release for 2021 is projected to be 8.23 maf (10,150 mcm).

Maintenance of the eight generating units at Glen Canyon Dam requires them to be taken out of service, in pairs, once each year for approximately one month. Additionally, in water years 2020 and 2021, all four transformers will be replaced, requiring the units to be taken out of service, in pairs, and should be completed by the end of calendar year 2021. Outages for annual maintenance and unit replacements are coordinated between Reclamation offices in Salt Lake City, Utah, and Page, Arizona, and WAPA to minimize impacts to operations.

Because of less than full storage conditions in Lake Powell resulting from drought in the Colorado River Basin, releases from Glen Canyon Dam for dam safety purposes are highly unlikely in 2021. If implemented, releases greater than powerplant capacity would be made consistent with the 1956 Colorado River Storage Project Act,[43] the CRBPA, the LTEMP ROD, and the Glen Canyon Dam Operating Criteria.

Releases from Lake Powell in water year 2021 will continue to reflect consideration of the uses and purposes identified in the authorizing legislation for Glen Canyon Dam. Monthly releases will also be consistent with the LTEMP ROD and applicable Secretarial decisions, and are updated to be consistent with annual volumes determined pursuant to the 2007 Interim Guidelines.

For the latest monthly projections for Lake Powell, please see the most recent 24-Month Study report available on Reclamation's Upper Colorado Region Water Operations website: https://www.usbr.gov/uc/water/crsp/studies/index.html.

Daily and hourly releases in 2021 will be made according to the parameters of the Glen Canyon Dam Operating Criteria. These parameters set the maximum and minimum flows and ramp rates within which reservoir releases must be made. Exceptions to these parameters will be made in accordance with the Emergency Exception Criteria as described in the Glen Canyon Dam Operating Criteria. WAPA and Reclamation invoked the Emergency Exception Criteria in August 2020 to assist California as it was experiencing rolling blackouts. There was no change to the annual release volume from Glen Canyon Dam in WY 2020.

During water year 2021, the Department of the Interior will coordinate planning for experimental flows from Glen Canyon Dam in accordance with the 2016 Glen Canyon Dam LTEMP ROD.

Lake Mead

For calendar year 2020, the ICS Surplus Condition was the criterion governing the operation of Lake Mead in accordance with Article III(3)(b) of the Operating Criteria, Article II(B)(2) of the Consolidated Decree, Section 2.B.5 of the 2007 Interim Guidelines, applicable provisions of the LB DCP Agreement, and Sections III.B.1.a, III.B.2.a, and III.E.3 of Exhibit 1 to the LB DCP Agreement. Delivery of water to Mexico was scheduled in accordance with Article 15 of the 1944 United States-Mexico Treaty and Minutes No. 242, 322, and 323 of the IBWC.

[43] Available online at: https://www.usbr.gov/lc/region/pao/pdfiles/crspuc.pdf.

Lake Mead began water year 2020 on October 1, 2019, at elevation 1,083.00 feet (330.10 meters), with 10.26 maf (12,660 mcm) in storage, which is 39 percent of the conservation capacity[44] of 26.12 maf (32,220 mcm). Lake Mead ended water year 2020 at elevation 1,083.21 feet (330.16 meters) with 10.28 maf (12,680 mcm) in storage (39 percent of capacity) on September 30, 2020.

The total release from Lake Mead through Hoover Dam during water year 2020 was 8.26 maf (10,190 mcm). The total release from Lake Mead through Hoover Dam during calendar year 2020 is projected to be 8.73 maf (10,770 mcm).

The total inflow into Lake Mead is a combination of water released from Glen Canyon Dam plus inflows in the reach between Glen Canyon and Hoover Dams. In water year 2020, inflow into Lake Mead was 9.09 maf (11,210 mcm), consisting of 8.23 maf (10,150 mcm) of water released from Glen Canyon Dam and 0.863 maf (1,060 mcm) of inflows between Glen Canyon and Hoover Dams. For water year 2021, under the most probable inflow scenario, total inflow into Lake Mead is projected to be 9.88 maf (12,190 mcm).

Based on the August 2020 24-Month Study, Lake Mead's elevation on January 1, 2021, is projected to be 1,085.28 feet (330.79 meters). In accordance with Section 2.B.5 of the 2007 Interim Guidelines and the applicable provisions of the LB DCP Agreement, the ICS Surplus Condition and Sections III.B.1.a and III.B.2.a of Exhibit 1 to the LB DCP Agreement, respectively, will govern the releases and diversions from Lake Mead in calendar year 2021. Releases from Lake Mead through Hoover Dam will be adjusted for DCP and water savings contributions in calendar year 2021.

Under the most probable inflow scenario, Lake Mead is projected to end water year 2021 at elevation 1,082.52 feet (329.95 meters), with 10.22 maf (12,610 mcm) in storage (39 percent of capacity). Lake Mead is projected to increase to elevation 1,086.90 feet (331.29 meters) with 10.59 maf (13,060 mcm) in storage (41 percent of capacity) at the end of calendar year 2021. For the latest monthly projections for Lake Mead, please see the most recent 24-Month Study report available on Reclamation's Lower Colorado Region Water Operations website: https://www.usbr.gov/lc/region/g4000/24mo/index.html.

Lakes Mohave and Havasu

Lake Mohave started water year 2020 at an elevation of 638.35 feet (194.57 meters) with 1.57 maf (1,940 mcm) in storage. The water level of Lake Mohave was regulated between elevation 636.35 feet (193.96 meters) and 645.73 feet (196.82 meters) during the water year, ending at an elevation of 636.50 feet (194.01 meters), with 1.52 maf (1,870 mcm) in storage. During water year 2020, 8.06 maf (9,940 mcm) was released from Davis Dam. The calendar year 2020 total release is projected to be 8.50 maf (10,480 mcm).

[44] Conservation capacity is the amount of space available for water storage between Lake Mead's water surface elevations 895 feet (272.8 meters) and 1,219.6 feet (371.7 meters), the start of the exclusive flood control space as defined in the Field Working Agreement Between Department of the Interior, Bureau of Reclamation and Department of the Army, Corps of Engineers for Flood Control of Hoover Dam and Lake Mead, Colorado River, Nevada-Arizona, February 8, 1984.

For water and calendar years 2021, Davis Dam is projected to release approximately the same amount of water as in 2020, and the water level in Lake Mohave will be regulated between an elevation of approximately 633.00 feet (192.94 meters) and 645.00 feet (196.60 meters).

Lake Havasu started water year 2020 at an elevation of 449.03 feet (136.86 meters) with 0.600 maf (740 mcm) in storage. The water level of Lake Havasu was regulated between elevation 445.91 feet (135.91 meters) and 449.58 feet (137.03 meters) during the water year, ending at an elevation of 446.61 feet (136.13 meters), with 0.554 maf (683 mcm) in storage. During water year 2020, 6.04 maf (7,450 mcm) was released from Parker Dam. The calendar year 2020 total release is projected to be 6.22 maf (7,670 mcm).

For water and calendar years 2021, Parker Dam is expected to release approximately the same amount of water as in 2020, and the water level in Lake Havasu will be regulated between an elevation of approximately 446.00 feet (135.94 meters) and 450.00 feet (137.16 meters).

Lakes Mohave and Havasu are scheduled to be drawn down in the late summer and fall months to provide storage space for local storm runoff and will be filled in the winter to meet higher summer water needs. This drawdown also corresponds with normal maintenance at both Davis and Parker powerplants scheduled for October through May.

Bill Williams River

Alamo Lake elevation and storage increased during water year 2020. Alamo Lake started water year 2020 at elevation 1,116.29 feet (340.25 meters) with ~~0.129 maf (159 mcm)~~ 0.109 maf (135 mcm) in storage, and ended water year 2020 at elevation 1,122.09 feet (342.01 meters) with 0.129 maf (159 mcm) in storage. Alamo Lake reached a maximum elevation of 1,139.22 feet (347.23 meters) on March 26, 2020.

In coordination with Reclamation, the U.S. Army Corps of Engineers (USACE) released additional water to lower the elevation of Alamo Lake in January and during March through May to reach a target elevation of 1,125.00 feet (342.90 meters). Approximately 0.0037 maf (4.6 mcm) of water was released from Alamo Lake from January 28 to January 31, 2020 with releases peaking at approximately 1,250 cfs (35.4 cms). Due to dry antecedent conditions, no water reached Lake Havasu. The January release resulted in a water surface elevation decrease of approximately 0.86 feet (0.26 meters) in Alamo Lake.

Approximately 0.059 maf (73 mcm) of water was released from Alamo Lake from March 17 to May 4, 2020 with releases peaking at approximately 1,020 cfs (28.9 cms) on April 17, 2020. Of this volume, approximately 0.049 maf (60 mcm) reached Lake Havasu and became system water available to meet downstream water demands. The March to May release resulted in a water surface elevation decrease of approximately 7.35 feet (2.24 meters) in Alamo Lake. The USACE began repair work on the sill of the outlet works at Alamo Dam in late July 2020. Between July 23 and September 9, releases from Alamo Dam fluctuated between 1.6 cfs (0.05 cms) and 833 cfs (23.6 cms).

Other than the periods from January 28 through January 31, 2020, from March 17 through May 4, 2020, and from July 23 to September 9 noted above, average daily releases from Alamo Lake ranged from about 1.5 to 25 cfs (0.04 to 0.71 cms). Water released from Alamo Lake totaled 0.083 maf (102 mcm) for water year 2020.

Senator Wash and Laguna Reservoirs

Senator Wash Reservoir is an off-stream regulating storage facility below Parker Dam (approximately 142 river miles downstream) and has a storage capacity of 0.014 maf (17 mcm) at full pool elevation of 251.00 feet (76.50 meters). The reservoir is used to store excess flows from the river caused by water user cutbacks, side wash inflows due to rain, and other factors. Stored waters are utilized to meet the water demands in Arizona and California and the delivery obligation to Mexico.

Since 1992, elevation restrictions have been in place on Senator Wash Reservoir due to potential piping and liquefaction of foundation and embankment materials at West Squaw Lake Dike and Senator Wash Dam. Senator Wash Reservoir is restricted to an elevation of 240.00 feet (73.15 meters) with 0.0090 maf (11 mcm) of storage, a loss of about 0.0050 maf (6.2 mcm) of storage from its original capacity. Senator Wash Reservoir must not exceed an elevation of 238.00 feet (72.54 meters) for more than 10 consecutive days. This reservoir restriction is expected to continue in 2021.

Laguna Reservoir is a regulating storage facility located approximately five river miles downstream of Imperial Dam and is primarily used to capture sluicing flows from Imperial Dam. The storage capability of Laguna Reservoir has diminished from about 0.0015 maf (1.9 mcm) to approximately 0.0004 maf (0.5 mcm) due to sediment accumulation and vegetation growth. Sediment accumulation in the reservoir has occurred primarily due to flood releases that occurred in 1983 and 1984, and flood control or space building releases that occurred between 1985 and 1988 and from 1997 through 1999.

Sediment removal at Laguna Reservoir to reestablish operational sluicing began in 2013 and the estimated completion date is 2022. In total, the Laguna Basin Dredging project will dredge approximately 3.55 million cubic yards (2.7 mcm) of sediment, reestablishing 140 acres (0.57 square kilometers) of open water. As of September 2020, approximately 2.99 million cubic yards (2.3 mcm) of material have been removed. All dredged material has been disposed of in a designated area adjacent to the project site. The project has incorporated the use of both land-based and waterborne heavy equipment. The project permit was obtained from the USACE in May 2013 and was valid through May 2020. Reclamation received approval from the USACE for a new permit with a completion date of May 2022.

Imperial Dam

Imperial Dam is the last major diversion dam on the Colorado River in the United States. From the head works at Imperial Dam, water is diverted into the All-American Canal on the California side of the dam and into the Gila Gravity Main Canal on the Arizona side of the

dam. These diversions provide water to the Gila Project, the Yuma Project, the Imperial Irrigation District (IID), the Coachella Valley Water District, and the City of Yuma, and through Siphon Drop and Pilot Knob to the Northerly International Boundary (NIB) for diversion at Morelos Dam by Mexico. Flows arriving at Imperial Dam for calendar year 2020 are projected to be 5.27 maf (6,500 mcm). The flows arriving at Imperial Dam for calendar year 2021 are projected to be 5.38 maf (6,640 mcm).

Gila River Flows

During water year 2020, there was above average snowfall in the Gila River Basin, including the Salt and Verde River watersheds. Runoff in the Verde River watershed resulted in Salt River Project releases in excess of diversion requirements at Granite Reef Diversion Dam from March 23 through March 30, 2020. The excess releases totaled approximately 0.030 maf (37 mcm). Despite these releases, no water reached or was released from Painted Rock Dam by the USACE in water year 2020.

Warren H. Brock Reservoir

The Warren H. Brock (Brock) Reservoir is located near the All-American Canal in Imperial County, California. The purpose of the 0.0080 maf (9.9 mcm) Brock Reservoir is to reduce nonstorable flows and to enhance beneficial use of Colorado River water within the United States. The reservoir reduces the impact of loss of water storage at Senator Wash due to operational restrictions and provides additional regulatory storage, allowing for more efficient management of water below Parker Dam.

Yuma Desalting Plant

The Yuma Desalting Plant (YDP) was authorized in 1974 under the Colorado River Basin Salinity Control Act (Public Law 93-320)[45] which authorized the federal government to construct the YDP to desalt the drainage flows from the Wellton-Mohawk Division of the Gila Project. This would allow the treated water to be delivered to Mexico as part of its 1944 United States-Mexico Water Treaty allotment. The United States has met salinity requirements established in IBWC Minute No. 242 primarily through use of a canal to bypass Wellton-Mohawk drain water to the Ciénega de Santa Clara (Ciénega), a wetland of open water, vegetation, and mudflats within a Biosphere Reserve in Mexico. In calendar year 2020, the amount of water discharged from the Wellton-Mohawk Division through the bypass canal is anticipated to be 0.104 maf (128 mcm) measured at gaging station 0+00 and 0.120 maf (148 mcm) measured at the gaging station near the Southerly International Boundary (SIB), at an approximate concentration of total dissolved solids of 2,390 parts per million (ppm).

[45] Available online at: https://www.usbr.gov/lc/region/pao/pdfiles/crbsalct.pdf.

Off-stream Storage Agreements

Colorado River water may be stored off-stream pursuant to individual SIRAs and 43 CFR Part 414 within the Lower Division States. The Secretary shall make ICUA available to contractors in Arizona, California, or Nevada pursuant to individual SIRAs and 43 CFR Part 414. SNWA may propose to make unused Nevada basic apportionment available for storage by MWD[46] and/or Arizona Water Banking Authority (AWBA)[47] in calendar years 2020 and 2021.

Intentionally Created Surplus

The 2007 Interim Guidelines included the adoption of the ICS mechanism that, among other things, encourages the efficient use and management of Colorado River water in the Lower Basin. ICS may be created through several types of activities that include improvements in system efficiency, extraordinary conservation, tributary conservation, and the importation of non-Colorado River System water into the Colorado River mainstream over the course of a calendar year. Several implementing agreements[48] were executed concurrent with the issuance of the ROD for the 2007 Interim Guidelines. The LB DCP Agreement, as authorized by Public Law 116-14 through the 2019 Colorado River DCP, expanded upon the ICS concept, including the execution of additional implementation agreements[49] and establishment of a DCP ICS category. ICS credits may be created and delivered in calendar years 2020 and 2021 pursuant to the 2007 Interim Guidelines, the LB DCP Agreement, and the implementing agreements. ICS balances by state, user, and type of ICS may be found in the annual Colorado River Accounting and Water Use Report, Arizona, California, and Nevada.[50]

IBWC Minute No. 323 identified cooperative measures that the United States and Mexico will take through December 31, 2026, including water conservation projects in Mexico. Consistent with Section IX.A of IBWC Minute No. 323, these water conservation projects will generate or conserve a volume of water of which 0.109 maf (134 mcm) will be converted to Binational ICS for use in the United States and 0.050 maf (62 mcm) will be allocated to the system for the benefit of all users.

Extraordinary Conservation ICS. Entities with approved plans may create Extraordinary Conservation ICS in 2020 and/or 2021. Table 5 provides a summary of anticipated, submitted, or approved Extraordinary Conservation ICS plans of creation in 2020 and 2021. Entities with

[46] Storage and Interstate Release Agreement among The United States of America, acting through the Secretary of the Interior; The Metropolitan Water District of Southern California; the Southern Nevada Water Authority; and the Colorado River Commission of Nevada, October 21, 2004. Available online at: https://www.usbr.gov/lc/region/g4000/contracts/SNWA_MWDSIRAfinal.pdf.

[47] Storage and Interstate Release Agreement among The United States of America, acting through the Secretary of the Interior; The Arizona Water Banking Authority; the Southern Nevada Water Authority; and the Colorado River Commission of Nevada, December 18, 2002. Available online at: https://www.usbr.gov/lc/region/g4000/contracts/SIRAfinal.pdf.

[48] Information on forbearance and delivery agreements related to the creation and delivery of ICS can be found at: https://www.usbr.gov/lc/region/programs/strategies/documents.html.

[49] Information on the agreements related to the creation of ICS under the LB DCP Agreement can be found at: https://www.usbr.gov/lc/region/programs/dcp.html.

[50] Available online at: https://www.usbr.gov/lc/region/g4000/wtracct.html.

available Extraordinary Conservation ICS may request delivery of ICS credits in 2020 and 2021.

Table 5. Summary of Extraordinary Conservation ICS Plans of Creation in Calendar Years 2020 and 2021

Entity	2020 Plan of Creation	Status of 2020 Plan	2021 Plan of Creation	Status of 2021 Plan
CAWCD	up to 0.060 maf (74 mcm)	approved	up to 0.061 maf (75 mcm)	submitted
Colorado River Indian Tribes	up to 0.0037 maf (4.9 mcm)	approved	up to 0.0047 maf (5.8 mcm)	submitted
Gila River Indian Community	up to 0.083 maf (102 mcm)	approved	up to 0.045 maf (56 mcm)	submitted
Mohave Valley Irrigation and Drainage District	up to 0.0061 maf (8.6 mcm)	approved	up to 0.0069 maf (8.5 mcm)	submitted
IID	up to 0.062 maf (76 mcm)	approved	up to 0.062 maf (76 mcm)	submitted
MWD	up to 0.450 maf (555 mcm)	approved	up to 0.450 maf (555 mcm)	submitted
SNWA	up to 0.100 maf (123 mcm)	approved	up to 0.100 maf (123 mcm)	submitted

System Efficiency ICS. In 2020 and 2021, CAWCD, MWD, and SNWA may request delivery of Brock Reservoir System Efficiency ICS credits. The annual maximum delivery of Brock Reservoir System Efficiency ICS is 0.065 maf (80 mcm). In 2020 and 2021, CAWCD, MWD, and SNWA may request delivery of YDP Pilot Run System Efficiency ICS credits.

Tributary Conservation ICS. SNWA has an approved plan to create up to 0.043 maf (53 mcm) of Tributary Conservation ICS in 2020 and has submitted a plan to create up to 0.043 maf (53 mcm) in 2021. Any Tributary Conservation ICS not delivered for use by SNWA in the calendar year created will, at the beginning of the following year, be converted to Extraordinary Conservation ICS pursuant to the 2007 Interim Guidelines.

Imported ICS. SNWA may submit plans to create Imported ICS in 2020 and 2021. Any Imported ICS not delivered for use by SNWA in the calendar year created will, at the beginning of the following year, be converted to Extraordinary Conservation ICS pursuant to the 2007 Interim Guidelines.

Binational ICS. In 2020 and 2021, CAWCD, IID, MWD, and SNWA may request delivery of Binational ICS subject to any applicable provisions in the delivery agreements.

DCP ICS. DCP ICS may be created in 2021 by entities making DCP contributions consistent with Section III of Exhibit 1 to the LB DCP Agreement. Following creation, DCP ICS may be delivered in a subsequent year in accordance with Section III.F of Exhibit 1 to the LB DCP Agreement.

System Conservation

System conservation agreements have allowed water users to participate in projects designed to determine whether voluntary, temporary, and compensated programs to conserve or reduce consumptive use of Colorado River water can benefit the entire Colorado River system by mitigating the effect on declining storage levels in Colorado River reservoirs.[51,52] Agreements previously executed under the PSCP in the Lower Basin continue to be implemented in 2020 and 2021.[53]

Under the LB DCP Agreement and subject to availability of appropriations, the Secretary is committed to taking affirmative actions to implement programs or projects to create or conserve 0.100 maf (123 mcm) or more of Colorado River system water annually in the Lower Basin. ~~An a~~Agreements to create ~~0.010 maf (12.3 mcm) of~~ system water in the Lower Basin to help meet this commitment are~~is~~ being implemented in 2020 and 2021.[54] Additional projects or agreements to create or conserve system water in the Lower Basin may also be implemented. ~~in 2020 and/or 2021.~~

Delivery of Water to Mexico

Delivery to Mexico pursuant to the 1944 United States-Mexico Water Treaty and IBWC Minute No. 323 is anticipated to be 1.433 maf (1,770 mcm) in calendar year 2020, reflecting the creation of approximately 0.067 maf (83 mcm) of water for Mexico's Water Reserve pursuant to Section V of IBWC Minute No. 323, of which 0.041 maf (51 mcm) originated from water savings contributions required by Mexico under Section IV of IBWC Minute No. 323. This volume shall be accounted for and remain as Mexico's Water Reserve as described in the Joint Report of the Principal Engineers with the Implementing Details of the Binational Water

[51] For the period from 2015 through 2018, the Upper Colorado River Commission (UCRC) acted as the contracting entity for the System Conservation Pilot Program (SCPP) in the Upper Basin. In June 2018, the UCRC passed a resolution to temporarily cease to act as the contracting entity for the SCPP after fulfilling its commitments for 2018. The June 20, 2018 Resolution of the UCRC is available online at: http://www.ucrcommission.com/RepDoc/SCPPDocuments/DemandMgmtResolution062018.pdf.

[52] Pursuant to Public Law 113-235, a report from the Secretary evaluating the effectiveness of the water conservation pilot projects is under development and will be submitted to Congress, including a recommendation on whether the activities undertaken by the pilot projects should be continued.

[53] More information on the PSCP in the Lower Basin can be found at: https://www.usbr.gov/lc/region/programs/PilotSysConsProg/pilotsystem.html.

[54] ~~An agreement~~ Agreements with the Fort McDowell-Yavapai Nation ~~is~~ are in place ~~for 2020~~ to create 10,000 af (12.3 mcm) of system water in 2020 and 13,933 af (17.2 mcm) of system water in 2021 and 2022.

Scarcity Contingency Plan in the Colorado River Basin (2019 Joint Engineers' Report).[55] Balances of Mexico's Water Reserve in previous years may be found in the annual Colorado River Accounting and Water Use Report, Arizona, California, and Nevada.[56]

Of the scheduled delivery to Mexico in calendar year 2020, approximately 1.293 maf (1,590 mcm) is projected to be delivered at NIB and approximately 0.140 maf (173 mcm) is projected to be delivered at SIB. Under IBWC Minute No. 322 and the Emergency Delivery Agreement,[57] water may be delivered to Tijuana, Baja California through MWD, the San Diego County Water Authority, and the Otay Water District's respective distribution system facilities in California. In calendar year 2020, approximately 921 acre-feet (1.1 mcm) is scheduled to be delivered to Tijuana, Baja California.

Of the total delivery at SIB projected in calendar year 2020, approximately 0.097 maf (120 mcm) is projected to be delivered from the Yuma Project Main Drain and approximately 0.034 maf (42 mcm) is expected to be delivered by the Protective and Regulatory Pumping Unit (242 well field).

Excess flows arriving at the NIB are anticipated to be approximately 0.058 maf (72 mcm) in calendar year 2020. Excess flows result from a combination of factors, including heavy rain from seasonal storms, water ordered but not delivered to United States users downstream of Parker Dam, inflows into the Colorado River below Parker Dam, and spills from irrigation facilities below Imperial Dam.

Pursuant to the 1944 United States-Mexico Water Treaty, a volume of 1.500 maf (1,850 mcm) will be available to be scheduled for delivery to Mexico, adjusted for water savings contributions as required under Section IV of IBWC Minute No. 323, in calendar year 2021. In accordance with IBWC Minute No. 323, Mexico may create water for or take delivery of water from Mexico's Water Reserve pursuant to Section V of IBWC Minute No. 323. Approximately 0.140 maf (173 mcm) is projected to be delivered at SIB and the remainder of the water to be scheduled for delivery to Mexico in 2021 will be delivered at NIB. Mexico, through IBWC, may request water to be delivered to Tijuana in calendar year 2021, consistent with IBWC Minute No. 322 and the Emergency Delivery Agreement.

Drainage flows to the Colorado River from the ~~Yuma Mesa Conduit and~~ South Gila Drain Pump Outlet Channels are projected to be ~~0 maf (0 mcm) and~~ 0.026 maf (32 mcm)~~,~~ ~~respectively,~~ for calendar year 2020. This water is available for delivery at NIB in satisfaction of the 1944 United States-Mexico Water Treaty. The Yuma Mesa Conduit is projected to not be used in calendar year 2020.

[55] Joint Report of the Principal Engineers with the Implementing Details of the Binational Water Scarcity Contingency Plan in the Colorado River Basin. Available online at: https://www.ibwc.gov/Files/joint_report_min323_bi_water_scarcity_contingency_plan_final.pdf.
[56] Available online at: https://www.usbr.gov/lc/region/g4000/wtracct.html.
[57] Agreement for Temporary Emergency Delivery of a Portion of the Mexican Treaty Waters of the Colorado River to the International Boundary in the Vicinity of Tijuana, Baja California, Mexico and for Operation of Facilities in the United States, dated January 18, 2017.

As stated in IBWC Minute No. 242, water delivered to Mexico upstream of Morelos Dam shall have an annual average salinity of no more than 115 ppm ± 30 ppm United States' count (121 ppm ± 30 ppm Mexican count) over the annual average salinity of Colorado River waters which arrive at Imperial Dam. This difference, known as the salinity differential, is projected to be 135 ppm by the United States' count for calendar year 2020.

Mexico has identified four critical months for agriculture, September through December, regarding improving the quality of water delivered at SIB. Consistent with Section VI.B of IBWC Minute No. 323, the United States has improved the water quality delivered at the SIB to approximately 1,200 ppm during this four-month period.

2021 DETERMINATIONS

The AOP provides projections regarding reservoir storage and release conditions during the upcoming year, based upon Congressionally-mandated and authorized storage, release, and delivery criteria and determinations. After meeting these criteria and determinations, specific reservoir releases may be modified within these requirements as forecasted inflows change in response to climatic variability and to provide additional benefits coincident to the projects' multiple purposes.

Upper Basin

Section 602(a) of the CRBPA provides for the storage of Colorado River water in Upper Basin reservoirs and the release of water from Lake Powell that the Secretary finds reasonably necessary to assure deliveries to comply with Articles III(c), III(d), and III(e) of the 1922 Colorado River Compact without impairment to the annual consumptive use in the Upper Basin. The Operating Criteria provide that the annual plan of operation shall include a determination of the quantity of water considered necessary to be in Upper Basin storage at the end of the water year after taking into consideration all relevant factors including historic streamflows, the most critical period of record, the probabilities of water supply, and estimated future depletions. Water not required to be so stored will be released from Lake Powell:

- to the extent it can be reasonably applied in the States of the Lower Division to the uses specified in Article III(e) of the 1922 Colorado River Compact, but these releases will not be made when the active storage in Lake Powell is less than the active storage in Lake Mead;

- to maintain, as nearly as practicable, active storage in Lake Mead equal to the active storage in Lake Powell; and

- to avoid anticipated spills from Lake Powell.

Taking into consideration all relevant factors required by Section 602(a)(3) of the CRBPA and the Operating Criteria, it is determined that the active storage in Upper Basin reservoirs projected for September 30, 2021, under the most probable inflow scenario would be below the threshold required under Section 602(a) of the CRBPA.

Taking into account (1) the existing water storage conditions in the basin, (2) the August 2020 24-Month Study projection of the most probable near-term water supply conditions in the basin, and (3) Section 6.B of the 2007 Interim Guidelines, the Upper Elevation Balancing Tier will govern the operation of Lake Powell for water year 2021. The August 2020 24-Month Study of the most probable inflow scenario projects the water year 2021 release from Glen Canyon Dam to be 9.0 maf (11,100 mcm). Given the hydrologic variability of the Colorado River System and based on actual 2020 water year operations, the projected water year release from Lake Powell in 2021 is likely to be in the estimated range of 8.23 maf (10,150 mcm) to 9.0 maf (11,100 mcm) or greater.

Lower Basin

Pursuant to Article III of the Operating Criteria and consistent with the Consolidated Decree, water shall be released or pumped from Lake Mead to meet the following requirements:

(a) 1944 United States-Mexico Water Treaty obligations;
(b) Reasonable beneficial consumptive use requirements of mainstream users in the Lower Division States;
(c) Net river losses;
(d) Net reservoir losses;
(e) Regulatory wastes; and
(f) Flood control.

The Operating Criteria provide that after the commencement of delivery of mainstream water by means of the Central Arizona Project, the Secretary will determine the extent to which the reasonable beneficial consumptive use requirements of mainstream users are met in the Lower Division States. Reasonable beneficial consumptive use requirements are met depending on whether a Normal, Surplus, or Shortage Condition has been determined. The Normal Condition is defined as annual pumping and release from Lake Mead sufficient to satisfy 7.50 maf (9,250 mcm) of consumptive use in accordance with Article III(3)(a) of the Operating Criteria and Article II(B)(1) of the Consolidated Decree. The Surplus Condition is defined as annual pumping and release from Lake Mead sufficient to satisfy in excess of 7.50 maf (9,250 mcm) of consumptive use in accordance with Article III(3)(b) of the Operating Criteria and Article II(B)(2) of the Consolidated Decree. An ICS Surplus Condition is defined as a year in which Lake Mead's elevation is projected to be above elevation 1,075.00 feet (327.66 meters) on January 1, a Flood Control Surplus has not been determined, and delivery of ICS has been requested. The Secretary may determine an ICS Surplus Condition in lieu of a Normal Condition or in addition to other operating conditions that are based solely on the elevation of Lake Mead. The Shortage Condition is defined as annual pumping and release from Lake Mead insufficient to satisfy 7.50 maf (9,250 mcm) of consumptive use in accordance with Article III(3)(c) of the Operating Criteria and Article II(B)(3) of the Consolidated Decree.

The 2007 Interim Guidelines are being utilized in calendar year 2021 and serve to implement the narrative provisions of Article III(3)(a), Article III(3)(b), and Article III(3)(c) of the Operating Criteria and Article II(B)(1), Article II(B)(2), and Article II(B)(3) of the Consolidated Decree for the period through 2026. The 2007 Interim Guidelines will be used annually by the Secretary to determine the quantity of water available for use within the Lower Division States.

Consistent with the 2007 Interim Guidelines and the LB DCP Agreement, the August 2020 24-Month Study was used to forecast the system storage as of January 1, 2021. Based on a projected January 1, 2021 Lake Mead elevation of 1,085.28 feet (330.79 meters) and consistent with Section 2.B.5 of the 2007 Interim Guidelines, the ICS Surplus Condition will govern releases for use in the states of Arizona, Nevada, and California during calendar year 2021 in accordance with Article III(3)(b) of the Operating Criteria and Article II(B)(2) of the Consolidated Decree. In addition, consistent with Sections III.B.1.a and III.B.2.a of Exhibit 1 to the LB DCP Agreement, DCP contributions will be required by Arizona and Nevada,

respectively, in calendar year 2021. Water deliveries in the Lower Basin during calendar year 2021 will be limited to 7.50 maf (9,250 mcm), and will be adjusted for DCP contributions and creation and/or delivery of ICS credits.

Article II(B)(6) of the Consolidated Decree allows the Secretary to allocate water that is apportioned to one Lower Division State but is for any reason unused in that state to another Lower Division State. This determination is made for one year only, and no rights to recurrent use of the water accrue to the state that receives the allocated water. No unused apportionment for calendar year 2021 is anticipated. If any unused apportionment becomes available after adoption of this AOP, Reclamation, on behalf of the Secretary, may allocate any such available unused apportionment for calendar year 2021 in accordance with Article II(B)(6) of the Consolidated Decree, the Unused Water Policy, and giving further consideration to the water conservation objectives of the July 30, 2014 agreement for the PSCP and as specified in Section 4.b of the LB DCP Agreement.

In calendar year 2021, water may be stored off-stream pursuant to individual SIRAs and 43 CFR Part 414 within the Lower Division States. The Secretary shall make ICUA available to contractors in Arizona, California, or Nevada pursuant to individual SIRAs and 43 CFR Part 414. SNWA may propose to make unused Nevada basic apportionment available for storage by MWD and/or AWBA in calendar year 2021.

The IOPP, which became effective January 1, 2004, will be in effect during calendar year 2021. Payback balances by state and user may be found in the annual Colorado River Accounting and Water Use Report, Arizona, California, and Nevada.[58]

In calendar year 2021, conserved Colorado River water, created through the PSCP and other voluntary agreements, is anticipated to be added to system reservoirs in the Lower Basin pursuant to system conservation agreements.

The 2007 Interim Guidelines included the adoption of the ICS mechanism, which was expanded upon in the LB DCP Agreement, that among other things encourages the efficient use and management of Colorado River water in the Lower Basin. The ICS Surplus Condition will govern Lower Basin operations in calendar year 2021 and ICS credits will be created and delivered pursuant to the 2007 Interim Guidelines, appropriate forbearance and delivery agreements, and the LB DCP Agreement.

Given the limitation of available supply and recent low inflow amounts within the Colorado River Basin, the Secretary, through Reclamation, will continue to review Lower Basin operations to assure that all deliveries and diversions of mainstream water are in strict accordance with the Consolidated Decree, applicable statutes, contracts, rules, and agreements.

As provided in Section 7.C of the 2007 Interim Guidelines, the Secretary may undertake a mid-year review to consider revisions of the current AOP. For Lake Mead, the Secretary shall revise the determination in any mid-year review for the current year only to allow for additional deliveries from Lake Mead pursuant to Section 7.C of the 2007 Interim Guidelines.

[58] Available online at: https://www.usbr.gov/lc/region/g4000/wtracct.html.

1944 United States-Mexico Water Treaty

Under the minimum probable, most probable, and maximum probable inflow scenarios, water in excess of that required to supply uses in the United States and the guaranteed quantity of 1.50 maf (1,850 mcm) allotted to Mexico will not be available, subject to any increased amounts delivered consistent with Section V of IBWC Minute No. 323. Vacant storage space in mainstream reservoirs is substantially greater than that required by flood control regulations. Therefore, a volume of 1.50 maf (1,850 mcm) of water will be available to be scheduled for delivery to Mexico during calendar year 2021 subject to and in accordance with Article 15 of the 1944 United States-Mexico Water Treaty and Minutes No. 242 and 322 of the IBWC, as further adjusted for water savings contributions as required under Section IV of IBWC Minute No. 323, as detailed in the 2019 Joint Engineers' Report In accordance with Section V of IBWC Minute No. 323, Mexico may create water for or take delivery of water from Mexico's Water Reserve.

Calendar year schedules of the monthly deliveries of Colorado River water are formulated by the Mexican Section of the IBWC and presented to the United States Section before the beginning of each calendar year. Changes to these delivery schedules are coordinated between the United States and Mexican Sections of the IBWC pursuant to Article 15 of the 1944 United States-Mexico Water Treaty and consistent with other applicable agreements.

DISCLAIMER

Nothing in this AOP is intended to interpret the provisions of the Colorado River Compact (45 Stat. 1057); the Upper Colorado River Basin Compact (63 Stat. 31); the Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande, Treaty Between the United States of America and Mexico (Treaty Series 994, 59 Stat. 1219); the United States/Mexico agreements in Minute No. 242 of August 30, 1973 (Treaty Series 7708; 24 UST 1968), Minute No. 322 of January 19, 2017, or Minute No. 323 of September 21, 2017; the Consolidated Decree entered by the Supreme Court of the United States in *Arizona v. California* (547 U.S 150 (2006)); the Boulder Canyon Project Act (45 Stat. 1057; 43 U.S.C. 617); the Boulder Canyon Project Adjustment Act (54 Stat. 774; 43 U.S.C. 618a); the Colorado River Storage Project Act (70 Stat. 105; 43 U.S.C. 620); the Colorado River Basin Project Act (82 Stat. 885; 43 U.S.C. 1501); the Colorado River Basin Salinity Control Act (88 Stat. 266; 43 U.S.C. 1951); the Hoover Power Plant Act of 1984 (98 Stat. 1333); the Hoover Power Allocation Act of 2011 (125 Stat. 777); the Colorado River Floodway Protection Act (100 Stat. 1129; 43 U.S.C. 1600); the Grand Canyon Protection Act of 1992 (Title XVIII of Public Law 102-575, 106 Stat. 4669); the Decree Quantifying the Federal Reserved Right for Black Canyon of the Gunnison National Park (Case No. 01CW05, District Court, Colorado Water Division No. 4, 2008); the Colorado River Drought Contingency Plan Authorization Act (Public Law 116-14); or the rules, criteria, guidelines, and decisions referenced within this AOP.

ACRONYMS AND ABBREVIATIONS

AMWG	Glen Canyon Dam Adaptive Management Work Group
AOP	Annual Operating Plan
AWBA	Arizona Water Banking Authority
bug flow	Macroinvertebrate Production Flow
CAWCD	Central Arizona Water Conservation District
CBRFC	National Weather Service's Colorado Basin River Forecast Center
cfs	cubic feet per second
cms	cubic meters per second
CRBPA	Colorado River Basin Project Act of 1968
DCP	Drought Contingency Plan
FG-Ops	Flaming Gorge Operation Plan
FGTWG	Flaming Gorge Technical Working Group
IBWC	International Boundary and Water Commission
ICMA	Intentionally Created Mexican Allocation
ICS	Intentionally Created Surplus
ICUA	Intentionally Created Unused Apportionment
IID	Imperial Irrigation District
IOPP	Inadvertent Overrun and Payback Policy
LB DCP Agreement	Lower Basin Drought Contingency Plan Agreement
LTEMP	Long-Term Experimental and Management Plan
LTSP	Larval Trigger Study Plan
maf	million acre-feet
mcm	million cubic meters
MWD	The Metropolitan Water District of Southern California
NIB	Northerly International Boundary
ppm	parts per million
PSCP	Pilot System Conservation Program
Reclamation	Bureau of Reclamation
ROD	Record of Decision
SCPP	System Conservation Pilot Program
Secretary	Secretary of the U.S. Department of the Interior
Service	U.S. Fish and Wildlife Service
SIB	Southerly International Boundary
SIRA	Storage and Interstate Release Agreement
SJRIP	San Juan River Basin Recovery Implementation Program
SNWA	Southern Nevada Water Authority
UCRC	Upper Colorado River Commission
UCRIP	Upper Colorado River Endangered Fish Recovery Program
USACE	U.S. Army Corps of Engineers
USGS	United States Geological Survey
WAPA	Western Area Power Administration
YDP	Yuma Desalting Plant