RECLAMATION

Managing Water in the West

DRAFT Annual Operating Plan for Colorado River Reservoirs 2020

Edits, in red, indicate changes from the Draft 2020 AOP posted on Reclamation's website for the Second Consultation of the 2020 AOP.

Hydrologic projections in this draft document of the 2020 AOP are based on the ***August 2019 24-Month Study****. Subsequent drafts will be updated with contemporary projections of hydrology.*

Text and values highlighted in blue are provisional and subject to change.

U.S. Department of the Interior
Bureau of Reclamation

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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 2020 AOP reports on 2019 operations as well as projected operations for 2020. 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 Plan (DCP)[11] as 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

[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 2019 Colorado River DCP agreements, as authorized by Public Law 116-14, were executed on May 20, 2019. Available online at: https://www.usbr.gov/dcp/finaldocs.html.

[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.

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 2020 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 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.

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[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.
[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.

The 2020 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; 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, 2020, 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~~s~~ 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]

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)).

[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.

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 2020 Operations

Upper Basin. Taking into account (1) the existing water storage conditions in the basin, (2) the August 2019 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 2020. The August 2019 24-Month Study of the most probable inflow scenario projects the water year 2020 release from Glen Canyon Dam to be 8.23 million acre-feet (maf) (10,150 million cubic meters [mcm]). Given the hydrologic variability of the Colorado River System and based on actual 2019 water year operations, the projected water year release from Lake Powell in 2020 is likely to be in the estimated range of 8.23 maf (10,150 mcm) to 13.49 maf (16,640 mcm) or greater.

For further information about the variability of projected inflow into Lake Powell, see the 2020 Water Supply Assumptions section and the Lake Powell section within the Summary of Reservoir Operations in 2019 and Projected 2020 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 2020 in accordance with Article III(3)(b) of the Operating Criteria and Article II(B)(2) of the Consolidated Decree. In addition, ~~consistent with Section III.A. of Exhibit 1 to~~ the Lower Basin Drought Contingency Plan Agreement (LB DCP Agreement)~~, Sections III.B.1.a and III.B.2.a of Exhibit 1 to the LB DCP Agreement~~ will also govern the operation of Lake Mead for calendar year 2020. 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 2020.

No unused apportionment for calendar year 2020 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 2020. Any such allocation shall be made in accordance with Article II(B)(6) of the Consolidated Decree, the Lower

[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.

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 2020, 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 2020.

Conserved Colorado River water, created through the PSCP[25] and other voluntary agreements, is anticipated to be added to ~~system~~ Lower Basin reservoirs pursuant to system conservation agreements in the Lower Basin in calendar year 2020.

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 2020 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 1.500 maf (1,850 mcm) of water will be available to be scheduled for delivery to Mexico during calendar year 2020 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.

2019 HYDROLOGY SUMMARY AND RESERVOIR STATUS

Above average stream flows were observed throughout much of the Colorado River Basin during water year 2019. Unregulated[26] inflow to Lake Powell in water year 2019 was 13.54 maf (16,700 mcm), or 125 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 109, 143, and 134 percent of average, respectively.

Precipitation in the Upper Colorado River Basin was above average[28] during water year 2019. On September 30, 2019, the cumulative precipitation received within the Upper Colorado River Basin for water year 2019 was 120 percent of average.

Snowpack conditions trended above average[29] across most of the Colorado River Basin throughout the snow accumulation season. The basin-wide snow water equivalent measured 134 percent of average on April 1, 2019. Total seasonal accumulation peaked at approximately 132 percent of average on April 15, 2019. On April 1, 2019, the snow water equivalents for the Green River, Upper Colorado River Headwaters, and San Juan River Basins were 101, 125, and 151 percent of average, respectively.

During the 2019 spring runoff period, inflows to Lake Powell peaked on June 18, 2019 at approximately 78,250 cubic feet per second (cfs) (2,210 cubic meters per second [cms]). The April through July unregulated inflow volume for Lake Powell was 10.41 maf (12,840 mcm) which was 145 percent of average.

Lower Basin tributary inflows above Lake Mead were above average for water year 2019. Tributary inflow ~~from~~ measured at the Little Colorado River near Cameron gage for water year 2019 totaled 0.201 maf (248 mcm), or 140 percent of average. Tributary inflow ~~from~~measured at the Virgin River at Littlefield gage for water year 2019 totaled 0.227 maf (280 mcm), or 125 percent of average.

Below Hoover Dam, tributary inflow for water year 2019 ~~from~~ measured at the Bill Williams River below Alamo Dam gage totaled 0.022 maf (27 mcm), and tributary inflow ~~from~~measured at the Gila River near Dome gage totaled 0.020 maf (25 mcm).[30]

The Colorado River total system storage experienced a net increase of 4.27 maf (5,270 mcm) in water year 2019. Reservoir storage in Lake Powell increased during water year 2019 by 2.74

[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.

maf (3,380 mcm). Reservoir storage in Lake Mead increased during water year 2019 by 0.556 maf (690 mcm). At the beginning of water year 2019 (October 1, 2018), Colorado River total system storage was 47 percent of capacity. As of September 30, 2019, total system storage was 54 percent of capacity.

Tables 1 and 2 list the October 1, 2019, reservoir vacant space, live storage, water elevation, percent of capacity, change in storage, and change in water elevation during water year 2019.

Table 1. Reservoir Conditions on October 1, 2019 (English Units)

Reservoir	Vacant Space	Live Storage	Water Elevation	Percent of Capacity	Change in Storage*	Change in Elevation*
	(maf)	(maf)	(ft)	(%)	(maf)	(ft)
Fontenelle	0.058	0.287	6,498.4	83	0.024	3.2
Flaming Gorge	0.347	3.400	6,031.4	91	0.025	0.6
Blue Mesa	0.089	0.740	7,509.3	89	0.457	64.8
Navajo	0.256	1.439	6,067.0	85	0.522	46.3
Lake Powell	10.55	13.77	3,620.0	57	2.74	27.7
Lake Mead	15.69	10.43	1,085.0	40	0.556	6.7
Lake Mohave	0.272	1.540	637.0	85	-0.023	-0.9
Lake Havasu	0.049	0.571	447.5	92	-0.028	-1.4
Totals	27.32	32.17		54	4.27	

* From October 1, 2018, to September 30, 2019.

Table 2. Reservoir Conditions on October 1, 2019 (Metric Units)

Reservoir	Vacant Space	Live Storage	Water Elevation	Percent of Capacity	Change in Storage*	Change in Elevation*
	(mcm)	(mcm)	(m)	(%)	(mcm)	(m)
Fontenelle	72	354	1,980.7	83	30	1.0
Flaming Gorge	428	4,200	1,838.4	91	31	0.2
Blue Mesa	110	912	2,288.8	89	564	19.8
Navajo	315	1,780	1,849.2	85	641	14.1
Lake Powell	13,010	17,000	1,103.4	57	3,380	8.5
Lake Mead	19,350	12,900	330.7	40	686	2.0
Lake Mohave	336	1,900	194.2	85	-28	-0.3
Lake Havasu	61	704	136.4	92	-35	-0.4
Totals	33,700	39,680		54	5,270	

* From October 1, 2018, to September 30, 2019.

2020 WATER SUPPLY ASSUMPTIONS

For 2020 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 2020 is 7.00 maf (8,630 mcm), or 65 percent of average.
- The forecasted most probable unregulated inflow to Lake Powell in water year 2020 is 10.80 maf (13,320 mcm), or 100 percent of average.
- The forecasted maximum probable unregulated inflow to Lake Powell in water year 2020 is 19.00 maf (23,440, mcm), or 175 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 2014 through December 2018, 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 2020 is 0.701 maf (865 mcm), the most probable inflow is 0.784 maf (967 mcm), and the maximum probable inflow is 0.868 maf (1,070 mcm).

The projected monthly volumes of inflow were input into the 24-Month Study and used to project potential reservoir operations for 2020. Starting with the August 2019 24-Month Study projection of the October 1, 2020 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 2020 (English Units)[31]

Time Period	Minimum Probable (maf)	Most Probable (maf)	Maximum Probable (maf)
10/2019 – 12/2019	1.51	1.64	1.77
1/2020 – 3/2020	1.47	1.52	1.96
4/2020 – 7/2020	3.58	6.84	13.60
8/2020 – 9/2020	0.42	0.81	1.67
10/2020 – 12/2020	1.13	1.31	1.81
WY 2020	7.00	10.80	19.00
CY 2020	6.60	10.48	19.04

Table 4. Projected Unregulated Inflow into Lake Powell for Water Year 2020 (Metric Units)

Time Period	Minimum Probable (mcm)	Most Probable (mcm)	Maximum Probable (mcm)
10/2019 – 12/2019	1,860	2,020	2,180
1/2020 – 3/2020	1,810	1,880	2,420
4/2020 – 7/2020	4,420	8,440	16,780
8/2020 – 9/2020	518	1,000	2,060
10/2020 – 12/2020	1,390	1,620	2,230
WY 2020	8,630	13,320	23,440
CY 2020	8,140	12,930	23,490

[31] All values in Tables 3 and 4 are projected inflows based upon the August 2019 CBRFC forecast with the exception of the values for 10/2020-12/2020. The values for 10/2020-12/2020 are based upon average unregulated inflow from 1981-2010. The calendar year totals in Tables 3 and 4 also reflect average values for the 10/2020-12/2020 time period. 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 2019 AND PROJECTED 2020 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 2019 and the range of probable projected 2020 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/rm/amp/index.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 ended water year 2019 at approximately the same percent capacity as it started the water year. At the beginning of water year 2019, Fontenelle storage was 76 percent of live capacity at elevation 6,495.11 feet (1,979.71 meters), with 0.262 maf (323 mcm) in storage. The unregulated inflow to Fontenelle during water year 2019 was 1.12 maf (1,380 mcm) which is 104 percent of average. At the end of the water year, September 30, 2019, Fontenelle storage was at 78 percent of live capacity at elevation 6,495.92 feet (1,979.96 meters), with a storage of 0.269 maf (332 mcm) resulting in a net increase during water year 2019 of 0.007 maf (8.6 mcm).

Hydrologic conditions in the Upper Green River Basin above Fontenelle were near average in water year 2019. Snowpack development tracked near median with average fall conditions maintaining soil moisture resulting in average runoff forecasts. Peak snow water equivalent reached 105 percent of seasonal median on April 17, 2019. The July forecast for the April through July inflow into Fontenelle Reservoir was 0.825 maf (1,020 mcm), or 114 percent of average. The observed inflow during the April to July season was 0.80 maf (987 mcm), or 111 percent of average.

Fontenelle Reservoir filled in water year 2019. The reservoir elevation peaked at 6,502.79 feet (1,982.05 meters) on August 8, 2019, which was 3.21 feet (0.98 meters) below the spillway crest. Daily inflow peaked at 10,300 cfs (291 cms) on June 10, 2019. 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 6,400 cfs (181 cms) on June 14, 2019 and were reduced to 1,200 cfs (34.0 cms) in September.

Based on the August 2019 24-Month Study, the most probable April through July inflow scenario for Fontenelle Reservoir during water year 2020 is 0.675 maf (833 mcm) or 93 percent of average. This volume exceeds the 0.346 maf (427 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 2020. 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 6,466.51 feet (1,970.99 meters) by early May 2020, which is 3.51 feet (1.07 meters) ~~below~~ above the minimum operating level for power generation, and corresponds to a volume of 0.105 maf (130 mcm) of live storage.

Flaming Gorge Reservoir

Reservoir storage in Flaming Gorge increased during water year 2019. At the beginning of water year 2019, Flaming Gorge storage was 90 percent of live capacity at elevation 6,030.75 feet (1,838.17 meters), with 3.38 maf (4,170 mcm) in storage. The unregulated inflow to Flaming Gorge during water year 2019 was 1.85 maf (2,280 mcm) which is 127 percent of average. At the end of the water year, Flaming Gorge storage was at 91 percent of live capacity at elevation 6,031.39 feet (1,838.37 meters), with 3.40 maf (4,190 mcm) resulting in a net increase during water year 2019 of 0.025 maf (31 mcm).

Flaming Gorge Dam operations in 2019 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 21, 2019. After public notification, releases from Flaming Gorge Dam were increased to full powerplant capacity on June 3, 2019. Bypass releases were utilized to bring the total release from Flaming Gorge Dam to 8,600 cfs (240 cms) for 7 days, starting on June 5, 2019, 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 17 days during the April through July runoff period. Yampa River flows at the Deerlodge gage peaked at 15,600 cfs (441 cms) on June 23, 2019. 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 18,600 cfs (526 cms) for 9 days between June 9 and June 18, 2019 with a peak of 20,800 cfs (589 cms) on June 11, 2019.

Hydrologic conditions in the Upper Green River Basin above Flaming Gorge were average in water year 2019. Snowpack development tracked near median with average fall conditions maintaining soil moisture resulting in near average runoff forecasts. Peak snow water equivalent reached 115 percent of seasonal median on April 17, 2019. The July forecast for the April through July inflow into Flaming Gorge Reservoir was 1.22 maf (1,500 mcm), or 124 percent of average. The observed inflow during the April to July season was 1.18 maf (1,460 mcm), or 120 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 moderately wet hydrologic classification. The 2006 Flaming Gorge ROD hydrologic classification for the Upper Green was characterized as average (above median). 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

[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.

was determined that, with the similar conditions in the Yampa River Basin, the hydrologic classification was average and the LTSP hydrologic classification was average (above median) based on the June forecast. Flows at Jensen ~~did meet or exceed~~met 2006 Flaming Gorge ROD flow targets in Reach 2 for the ROD Flow Recommendation of at least 18,600 cfs (526 cms) for 9 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 recovery of Colorado Pikeminnow during the summer of 2019. The 2006 Flaming Gorge ROD base flow period hydrologic classification was average as of mid-June 2019. Daily base flows fluctuated during the summer to meet ~~or exceed~~ 2,000 to 2,600 cfs (56.6 to 73.6 cms) on the Green River at Jensen, Utah through September 30, 2019.

The Flaming Gorge Operation Plan for May 2019 through April 2020 (FG-Ops) has been developed and approved by Reclamation. The FG-Ops outlines the UCRIP request that includes the LTSP and Bestgen and Hill (2016)[36] study and experiments for the razorback sucker (spring peak period) and Colorado pikeminnow (autumn base flow period). The FG-Ops includes a plan release schedule for 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.[37]

Under the August 2019 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 2,400 cfs (67.9 cms). Daily base flows will likely fluctuate during the winter in response to hydropower needs during November 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, 2020. A spring peak release is projected to occur in May or June 2020, 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 2019 24-Month Study, the most probable April through July inflow scenario for Flaming Gorge Reservoir during water year 2020 is 0.905 maf (1,120 mcm) or 92 percent of average. The peak elevation is expected to be approximately 6,029.79 feet (1,837.88 meters) near late-May 2020. By the end of water year 2020, Flaming Gorge Reservoir is projected to be at elevation 6,027.89 feet (1,837.30 meters), with a storage of 3.27 maf (4,030 mcm), or 87 percent of capacity.

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

[37] 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.

The UCRIP, in coordination with Reclamation, the Service, and WAPA, will continue conducting studies associated with floodplain inundation. Such studies may result in 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 in Blue Mesa increased during water year 2019. At the beginning of water year 2019, Blue Mesa storage was 34 percent of live capacity at elevation 7,444.44 feet (2,269.07 meters), with 0.282 maf (348 mcm) in storage content. The unregulated inflow to Blue Mesa during water year 2019 was 1.36 maf (1,680 mcm) which was 142 percent of average. At the end of the water year, Blue Mesa storage was 82 percent of live capacity at elevation 7,509.29 feet (2,288.83 meters), with 0.740 maf (913 mcm) resulting in a net increase during water year 2019 of 0.458 maf (565 mcm).

Above average snowpack conditions occurred during the winter months of water year 2019 in the Gunnison River Basin. Snow measurement sites in the basin reported above average seasonal snow water equivalent levels throughout the winter and into the spring of 2019 resulting in an April 1, 2019 snow water equivalent for the Gunnison River Basin that was 149 percent of average.

The fall through winter releases from Crystal Dam varied between approximately 350 cfs (9.9 cms) in November 2018 to 470 cfs (13 cms) in February 2019. On April 1, 2019, releases from Crystal Dam were increased for operation of the Gunnison Tunnel. Flows through the Black Canyon were maintained within the range of approximately 470 cfs (13 cms) to approximately 966 cfs (27 cms) until May 21, 2019.

The May 2019 final forecast for the unregulated inflow to Blue Mesa for the April through July runoff period was 0.970 maf (1,200 mcm) which was 143 percent of average. This forecast was used to establish the hydrologic category for water year 2019 as Moderately Wet as described in the 2012 Aspinall ROD. In years that fall within the average wet, moderately wet, or wet category, as described in the Aspinall ROD, that follow a year that was categorized as dry, if Blue Mesa falls below a storage level of 0.520 maf (641 mcm) on December 31 and also below 0.400 maf (493 mcm) on March 31, half-bankfull targets are reduced to the next lower category. Water year 2019 met this condition so the half-bankfull duration was reduced from 40 days to 20 days.

On May 22, 2019, 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.[38] During spring peak operations, flows measured in the Whitewater Reach of the Gunnison River met the desired target of ~~exceeded~~ 14,350 cfs (406 cms) for 6 days between June 5, 2019 and June 10, 2019. Half-bank level flows of 8,070 cfs (228 cms) were ~~exceeded~~ met for 21 days during the spring peak operation period between May 29, 2019

[38] 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.

and June 18, 2019. Releases from Crystal Dam on June 4, 2019 ~~during spring operations, consistent with the 2012 Aspinall ROD peak flow target,~~ resulted in a 24-hour average peak flow through the Black Canyon and the Gunnison River Gorge of ~~7,670~~7,815 cfs (~~217~~ 221 cms) as measured at the streamgage located on the Gunnison River below the Gunnison Tunnel. ~~for 24 hours on June 5, 2019, and~~ Gunnison River flows in the Black Canyon ~~exceeded~~ met or exceeded the flows described in the Black Canyon Water Right Decree.

For water year 2020, the Aspinall Unit will be operated in ~~accordance~~ 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 2019 24-Month Study, the projected most probable unregulated inflow for water year 2020 into Blue Mesa Reservoir is 0.970 maf (1,200 mcm), or 102 percent of average. The reservoir is expected to reach a seasonal low elevation of 7,477.40 feet (2,279.11 meters) by late May 2020. The peak elevation is expected to be approximately 7,506.70 feet (2,288.04 meters) near the end of July 2020. By the end of water year 2020, Blue Mesa Reservoir is projected to be at elevation 7,502.35 feet (2,286.72 meters), with a storage content of 0.681 maf (840 mcm), or 82 percent of capacity.

Navajo Reservoir

Storage in Navajo Reservoir increased during water year 2019. At the beginning of water year 2019, Navajo storage was 54 percent of live capacity at elevation 6,020.58 feet (1,835.07 meters), with 0.917 maf (1,130 mcm) in storage. The modified unregulated inflow[39] to Navajo during water year 2019 was 1.45 maf (1,790 mcm) which is 135 percent of average. At the end of the water year, Navajo storage was at 85 percent of live capacity at elevation 6,066.97 feet (1,849.21 meters), with 1.44 maf (1,780 mcm) resulting in a net increase during water year 2019 of 0.522 maf (644 mcm).

A channel maintenance release was conducted from June 3, 2019 through June 15, 2019, peaking at 5,060 cfs (143 cms) and totaling 0.080 maf (99 mcm) of water over the base release. Reservoir storage in Navajo largely increased throughout water year 2019 peaking at an elevation of 6,074.76 feet (1,851.59 meters) on July 9, 2019. This was 20.80 feet (6.34 meters) below full pool. The April through July modified unregulated inflow into Navajo Reservoir in water year 2019 was 1.16 maf (1,430 mcm), or 158 percent of average.

The San Juan Flow Recommendations,[40] 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. The flow recommendations are currently under review by the SJRIP.

[39] 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.
[40] 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.

In water year 2019, 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 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 2019, including the SJRIP's target base flows. For the summer of 2019, the SJRIP has recommended an augmented target base flow of 1,500 cfs (42.5 cms) through the critical habitat area. The target base flow is calculated as the weekly average of gaged flows throughout the critical habitat area from Farmington to Lake Powell. Reclamation will attempt to maintain this augmented baseflow as long as water is available over the End of Water Year Storage Target elevation. Based on the SJRIP and Reclamation's interim operations for water year 2019, there was no spring peak release at Navajo Reservoir.

During water year 2020, Navajo Reservoir will be operated in accordance with the 2006 Navajo Reservoir ROD. Navajo Reservoir storage levels are expected to be near average in 2020 under the most probable inflow forecast. Base releases from the reservoir will likely range from 350 cfs (9.91 cms) to 600 cfs (17 cms) through the winter. Based on the August 2019 most probable April through July modified unregulated inflow forecast of 0.660 maf (814 mcm) in 2020, the August 2019 24-Month Study projects a 39-day spring peak release would be recommended by the anticipated SJRIP and Reclamation's interim operations for water year 2020. The reservoir is projected to reach a peak elevation of 6,073.44 feet (1,851.18 meters) in April 2020. The reservoir is projected to reach a minimum elevation of 6,053.90 feet (1,845.23 meters) in September 2020.

Under the minimum probable 2020 April through July inflow forecast of 0.330 maf (407 mcm), there will be no spring peak release during the spring of 2020. Under the maximum probable 2020 April through July inflow forecast of 1.24 maf (1,530 mcm), a 60-day spring peak release will be recommended as described by the anticipated SJRIP and Reclamation's interim operations for water year 2020.

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 ~~is currently awaiting~~has received endorsements from all participating parties, and final signatures from the New Mexico State Engineer's office.

Lake Powell

Reservoir storage in Lake Powell increased during water year 2019. At the beginning of water year 2019, Lake Powell storage was 45 percent of live capacity at elevation 3,592.28 feet (1,094.93 meters), with 11.03 maf (13,610 mcm) in storage. The unregulated inflow to Lake Powell during water year 2019 was 13.54 maf (16,700 mcm) which is 125 percent of average. At the end of the water year, Lake Powell storage was at 57 percent of live capacity at elevation 3,620.02 feet (1,103.38 meters), with 13.77 maf (16,990 mcm) resulting in a net increase during water year 2019 of 2.74 maf (3,380 mcm).

The August 2018 24-Month Study was run to project the January 1, 2019, elevations of Lake Powell and Lake Mead and determine the water year 2019 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, 2019, reservoir elevations of Lake Powell and Lake Mead were projected to be 3,586.55 feet (1,093.18 meters) and 1,079.50 feet (329.03 meters), respectively. Given these projections, the annual release volume from Lake Powell during water year 2019 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 2019 24-Month Study was run with an 8.23 maf (10,150 mcm) annual release volume to project the September 30, 2019, 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 3,618.44 feet (1,102.90 meters) and Lake Mead was 1,072.84 feet (327.00 meters). Since the projected end of water year elevation at Lake Powell was below the 2019 Equalization elevation of 3,655.00 feet (1,114.04 meters) and above 3,575.00 feet (1,089.66 meters) and the projected Lake Mead elevation was below 1,075.00 feet (327.66 meters), Section 6.B.4 of the 2007 Interim Guidelines governed for the remainder of water year 2019. Under Section 6.B.4, 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. The annual release volume during water year 2019 was 9.00 maf (11,100 mcm).

The April through July unregulated inflow to Lake Powell in water year 2019 was 10.41 maf (12,840 mcm) which was 145 percent of average. Lake Powell's water surface elevation increased throughout most of water year 2019, starting the year at 3,592.28 feet (1,094.93 meters), which was 107.72 feet (32.83 meters) below full pool. This elevation corresponds to a live storage content of 11.03 maf (13,610 mcm).

~~In December 2016, the Secretary signed the LTEMP ROD.~~ In water year 2019, Glen Canyon Dam was operated in compliance with ~~operations followed~~ the LTEMP ROD. The first High Flow Experiment~~al~~ release under the LTEMP was conducted during November 2018. Reclamation released the maximum available capacity of 38,100 cfs (1,080 cms) during the experiment, which began on November 5 and ended on November 8, 2018. Approximately 0.077 maf (95 mcm) was bypassed during the experiment. The first Macroinvertebrate

Production Flow (bug flow) experiment under the LTEMP was designed and conducted during May through August 2018, with the second bug flow experiment completed in May through August 2019. ~~Hydropower peaking~~ During these experiments, releases were held steady during Saturday and Sunday in an attempt to increase production of aquatic insects. ~~The second bug flow experiment was completed in May through August 2019.~~ The total annual release from Glen Canyon Dam in water year 2019 did not change as a result of the experimental releases.

The ten-year total flow of the Colorado River at Lee Ferry[41] for water years 2010 through 2019 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.

2020 Operating Tier and Projected Operations for Glen Canyon Dam. The January 1, 2020 reservoir elevations of Lake Powell and Lake Mead are projected under the most probable inflow scenario to be 3,618.56 feet (1,102.94 meters) and 1,089.40 feet (332.05 meters), respectively, based on the August 2019 24-Month Study. Given these projections, the operating tier and annual release volume from Lake Powell during water year 2020 will be 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 2020 24-Month Study, with a water year release volume of 8.23 maf (10,150 mcm) projects the September 30, 2020, Lake Powell elevation to be greater than 3,657.00 feet (1,114.65 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 2020 24-Month Study, with a water year release volume of 8.23 maf (10,150 mcm), projects the September 30, 2020, Lake Powell elevation to be at or above 3,575.00 feet (1,089.66 meters) and below the 2020 Equalization level of 3,657.00 feet (1,114.65 meters), and the September 30, 2020, 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 2020 consistent with Section 6.B.4 of the 2007 Interim Guidelines.

Under the minimum probable inflow scenario, the August 2019 24-Month Study, with a projected water year release volume of 8.23 maf (10,150 mcm) in water year 2020, projects that the elevations of Lake Powell and Lake Mead on September 30, 2020, would be 3,612.11 feet (1,100.97 meters) and 1,074.26 feet (327.43 meters), respectively. Based on these projections, an April adjustment to balancing is projected to govern Lake Powell operations under the minimum probable inflow scenario and the water year release for 2020 is projected to be 9.00

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

maf (11,100, mcm). The end of water year elevation and storage of Lake Powell is projected to be 3,605.03 feet (1,098.81 meters) and 12.24 maf (15,100 mcm), respectively, based on the minimum probable inflow scenario.

Under the most probable inflow scenario, the August 2019 24-Month Study, with a projected water year release volume of 8.23 maf (10,150 mcm) in water year 2020, projects that the elevations of Lake Powell and Lake Mead on September 30, 2020, would be 3,640.14 feet (1,109.51 meters) and 1,077.28 feet (328.35 meters), respectively. Based on these projections, under the most probable inflow scenario, an April adjustment to balancing is not projected to occur during water year 2020. Consistent with Section 6.B.1, the 2020 water year release volume projected under the most probable inflow scenario is 8.23 maf (10,150 mcm) and the end of water year elevation and storage of Lake Powell is projected to be 3,640.14 feet (1,109.51 meters) and 16.02 maf (19,760 mcm), respectively.

Under the maximum probable inflow scenario, the August 2019 24-Month Study, with a projected water year release volume of 8.23 maf (10,150 mcm) in water year 2020, projects that the elevation of Lake Powell on September 30, 2020, would be 3,691.04 feet (1,125.03 meters). This elevation is above the Equalization Level for water year 2020 of 3,657.00 feet (1,114.65 meters). Based on this projection, an April adjustment to Equalization is projected to occur under the maximum probable inflow scenario and the water year release for 2020 is projected to be 13.49 maf (16,640 mcm). The end of water year elevation and storage of Lake Powell is projected to be 3,657.00 feet (1,114.65 meters) and 18.10 maf (22,330 mcm), respectively, based on the maximum probable inflow scenario.

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 2019 and 2020, all three transformers will be replaced, requiring the units to be taken out of service, in pairs, and should be completed during the summer of 2020. 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 2020. If implemented, releases greater than powerplant capacity would be made consistent with the 1956 Colorado River Storage Project Act,[42] the CRBPA, the LTEMP ROD, and the Glen Canyon Dam Operating Criteria.

Releases from Lake Powell in water year 2020 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.

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

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 2020 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.

During water year 2020, 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 2019, 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, and applicable provisions of 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.

Lake Mead began water year 2019 on October 1, 2018, at elevation 1,078.29 feet (328.66 meters), with 9.87 maf (12,170 mcm) in storage, which is 38 percent of the conservation capacity[43] of 26.12 maf (32,220 mcm). Lake Mead ended water year 2019 at elevation 1,084.96 feet (330.70 meters) with 10.43 maf (12,870 mcm) in storage (40 percent of capacity) on September 30, 2019.

The total release from Lake Mead through Hoover Dam during water year 2019 was 8.80 maf (10,850 mcm). The total release from Lake Mead through Hoover Dam during calendar year 2019 is projected to be 8.61 maf (10,620 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 2019, inflow into Lake Mead was 10.16 maf (12,530 mcm), consisting of 9.00 maf (11,100 mcm) of water released from Glen Canyon Dam and 1.16 maf (1,430 mcm) of inflows between Glen Canyon and Hoover Dams. For water year 2020, under the most probable inflow scenario, total inflow into Lake Mead is projected to be 9.01 maf (11,110 mcm).

[43] 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.

Based on the August 2019 24-Month Study, Lake Mead's elevation on January 1, 2020, is projected to be 1,089.40 feet (332.05 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 2020. Releases from Lake Mead through Hoover Dam will be adjusted for DCP and water savings contributions in calendar year 2020. ~~for water year and calendar year 2020 are anticipated to be approximately the same as 2019 releases.~~

Under the most probable inflow scenario, Lake Mead is projected to end water year 2020 at elevation 1,077.28 feet (328.35 meters), with 9.79 maf (12,080 mcm) in storage (37 percent of capacity). Lake Mead is projected to increase to elevation 1,082.10 feet (329.82 meters) with 10.19 maf (12,570 mcm) in storage (39 percent of capacity) at the end of calendar year 2020. 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 2019 at an elevation of 637.87 feet (194.42 meters) with 1.56 maf (1,920 mcm) in storage. The water level of Lake Mohave was regulated between elevation 637.08 feet (194.18 meters) and 643.32 feet (196.08 meters) during the water year, ending at an elevation of 637.00 feet (194.16 meters), with 1.54 maf (1,900 mcm) in storage. During water year 2019, 8.49 maf (10,470 mcm) was released from Davis Dam. The calendar year 2019 total release is projected to be 8.35 maf (10,300 mcm).

For water and calendar years 2020, Davis Dam is projected to release approximately the same amount of water as in 2019, and the water level in Lake Mohave will be regulated between an elevation of approximately 633 feet (193 meters) and 645 feet (197 meters).

Lake Havasu started water year 2019 at an elevation of 448.95 feet (136.84 meters) with 0.598 maf (738 mcm) in storage. The water level of Lake Havasu was regulated between elevation 446.53 feet (136.10 meters) and 448.62 feet (136.74 meters) during the water year, ending at an elevation of 447.50 feet (136.40 meters), with 0.570 maf (703 mcm) in storage. During water year 2019, 6.22 maf (7,670 mcm) was released from Parker Dam. The calendar year 2019 total release is projected to be 6.35 maf (7,830 mcm).

For water and calendar years 2020, Parker Dam is expected to release approximately the same amount of water as in 2019, and the water level in Lake Havasu will be regulated between an elevation of approximately 446 feet (136 meters) and 450 feet (137 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 2019. Alamo Lake started water year 2019 at elevation 1,094.40 feet (333.57 meters) with 0.067 maf (82.6 mcm) in storage, and ended water year 2019 at elevation 1,117.52 feet (340.62 meters) with 0.133 maf (164 mcm) in storage. In water year 2019, average daily releases from Alamo Lake ranged from about 10 to 25 cfs (0.28 to 0.71 cms). Water released from Alamo Lake totaled 0.022 maf (27 mcm) for water year 2019.

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 0.009 maf (11 mcm) of storage, a loss of about 0.005 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 2020.

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 ~~2.25~~3.55 million cubic yards (~~1.73~~2.71 mcm) of sediment, reestablishing 140 acres (0.57 square kilometers) of open water. As of August 2019, approximately 2.48 million cubic yards (1.90 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 2019. Reclamation ~~is waiting for~~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 ~~for~~in the United States ~~water users~~. 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 ~~in~~by Mexico. Flows arriving at Imperial Dam for calendar year 2019 are projected to be 5.41 maf (6,670 mcm). The flows arriving at Imperial Dam for calendar year 2020 are projected to be 5.45 maf (6,720 mcm).

Gila River Flows

During water year 2019, 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 February through March 2019; however, no water reached or was released from Painted Rock Dam by the USACE in water year 2019.

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 0.008 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)[44] 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 2019, the amount of water discharged from the Wellton-Mohawk Division through the bypass canal is anticipated to be 0.101 maf (125 mcm) measured at station 0+00 and 0.126 maf (155 mcm)

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

measured at the Southerly International Boundary (SIB), at an approximate concentration of total dissolved solids of 2,417 parts per million (ppm).

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[45] and/or Arizona Water Banking Authority (AWBA)[46] in calendar years 2019 and 2020.

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[47] 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[48] and establishment of a DCP ICS category. ICS credits may be created and delivered in calendar years 2019 and 2020 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.[49]

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 (135 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.

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[45] 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.

[46] 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.

[47] 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.

[48] Information on the agreements related to the creation ~~and delivery~~ of ICS under the LB DCP Agreement can be found at: [Link to be added later].

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

Extraordinary Conservation ICS. Entities with approved plans may create Extraordinary Conservation ICS in 2019 and/or 2020. Table 5 provides a summary of anticipated, submitted, or approved Extraordinary Conservation ICS plans of creation in 2019 and 2020. Entities with available Extraordinary Conservation ICS may request delivery of ICS credits in 2019 and 2020.

Table 5. Summary of Extraordinary Conservation ICS Plans of Creation in Calendar Years 2019 and 2020

Entity	2019 Plan of Creation	Status of 2019 Plan	2020 Plan of Creation	Status of 2020 Plan
CAWCD	up to 0.026 maf (32 mcm)	approved	up to 0.029 maf (36 mcm)	submitted
Colorado River Indian Tribes	up to 0.006 maf (7.4 mcm)	approved	up to 0.004 maf (4.9 mcm)	submitted
Gila River Indian Community	up to 0.117 maf (144 mcm)	approved	up to 0.083 maf (102 mcm)	submitted
Mohave Valley Irrigation and Drainage District	—	—	up to 0.007 maf (8.6 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 2019 and 2020, 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 2019 and 2020, 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 0.042 maf (52 mcm) of Tributary Conservation ICS in 2019 and ~~is anticipated to submit~~has submitted a plan to create up to 0.042 maf (52 mcm) in 2020. 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 2019 and 2020. 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 2019 and 2020, 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 2020 by entities making DCP contributions ~~by the parties to the LB DCP Agreement with applicable ICS implementation agreements in accordance~~ consistent with Section III~~.E~~ 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 under the PSCP 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.[50,51] Agreements previously executed under the PSCP in the Lower Basin ~~will~~ continue to be implemented in 2019 and 2020.[52] Additional agreements for new system conservation may be implemented in 2020 in the Lower Basin.

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. Projects or agreements to create or conserve system water in the Lower Basin to help meet this commitment may be implemented in 2020.

[50] 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.

[51] 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.

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

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 1.470 maf (1,813 mcm) in calendar year 2019, reflecting the creation of approximately 0.030 maf (37 mcm) of water for Mexico's Water Reserve pursuant to Section V of 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 in calendar year 2019.~~ 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.[53]

Of the scheduled delivery to Mexico in calendar year 2019, approximately 1.330 maf (1,640 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,[54] 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 2019, approximately 706 acre-feet (0.87 mcm) is scheduled to be delivered to Tijuana, Baja California.

Of the total delivery at SIB projected in calendar year 2019, approximately 0.110 maf (136 mcm) is projected to be delivered from the Yuma Project Main Drain and approximately 0.030 maf (37 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 0.010 maf (12.3 mcm) in calendar year 2019. 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 2020. 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 2020 will be delivered at NIB. Mexico, through IBWC, may request water to be delivered to Tijuana in calendar year 2020, 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 0.014 maf (17 mcm) and 0.023 maf (28 mcm),

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

[54] 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.

respectively, for calendar year 2019. This water is available for delivery at NIB in satisfaction of the 1944 United States-Mexico Water Treaty.

As stated in Minute No. 242, the maximum allowable salinity differential is 145 ppm by the United States' measurement or count and 151 ppm by the Mexican count. The salinity differential for calendar year 2019 is projected to be 144 ppm by the United States' count.

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.

2020 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, 2020, 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 2019 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 2020. The August 2019 24-Month Study of the most probable inflow scenario projects the water year 2020 release from Glen Canyon Dam to be 8.23 maf (10,150 mcm). Given the hydrologic variability of the Colorado River System and based on actual 2019 water year operations, the projected water year release from Lake Powell in 2020 is likely to be in the estimated range of 8.23 maf (10,150 mcm) to 13.49 maf (16,640 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 7.500 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 7.500 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 1,075.0 feet (327.7 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 7.500 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 2020 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 ~~applicable provisions of~~ the LB DCP Agreement, the August 2019 24-Month Study was used to forecast the system storage as of January 1, 2020. Based on a projected January 1, 2020 Lake Mead elevation of 1,089.40 feet (332.05 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 2020 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 2020. Water deliveries in the Lower Basin during calendar year 2020 will be limited to 7.500 maf (9,250 mcm), and will be adjusted for DCP contributions ~~as required under Sections III.B.1.a and III.B.2.a of Exhibit 1 to the LB DCP Agreement,~~ and creation and/or delivery of ICS credits.~~plus or minus any credits for ICS.~~

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 2020 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 2020 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 2020, 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 2020.

The IOPP, which became effective January 1, 2004, will be in effect during calendar year 2020. Payback balances by state and user may be found in the annual Colorado River Accounting and Water Use Report, Arizona, California, and Nevada.[55]

In calendar year 2020, 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 2020 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

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

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.

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 1.500 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 1.500 maf (1,850 mcm) of water will be available to be scheduled for delivery to Mexico during calendar year 2020 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 described in the IBWC Joint Report of the Principal Engineers dated July 11, 2019.[56] 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. ~~Pursuant to the 1944 United States-Mexico Water Treaty, the monthly quantity prescribed by those schedules may be increased or decreased by not more than 20 percent of the monthly quantity, upon 30-day notice in advance to the United States Section. Any change in a monthly quantity is offset in another month so that the total delivery for the calendar year is unchanged, subject to the provisions of the 1944 United States-Mexico Water Treaty (which contains specific provisions regarding adjustment of delivery schedules) and IBWC Minute No. 323.~~

[56] Available online at: https://www.ibwc.gov/Files/joint_report_min323_bi_water_scarcity_contingency_plan_final.pdf.

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
FGTWG	Flaming Gorge Technical Working Group
FG-Ops	Flaming Gorge Operation Plan
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
Secretary	Secretary of the U.S. Department of the Interior
Service	U.S. Fish and Wildlife Service
SCPP	System Conservation Pilot Program
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
USACE	U.S. Army Corps of Engineers
USGS	United States Geological Survey
UCRIP	Upper Colorado River Endangered Fish Recovery Program
WAPA	Western Area Power Administration
YDP	Yuma Desalting Plant