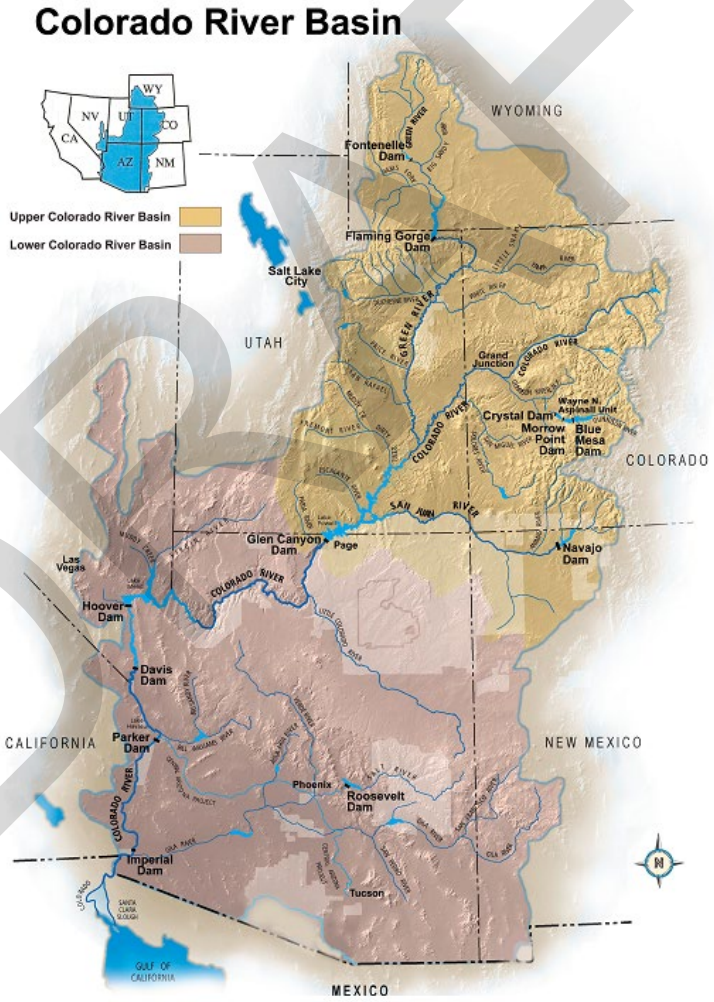
BUREAU OF RECLAMATION

Annual Operating Plan for Colorado River Reservoirs 2023



U.S. Department of the Interior

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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 2023 AOP reports on 2022 operations as well as projected operations for 2023. 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 Code of Federal Regulations [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 between the United States and Mexican Sections of the International Boundary and Water Commission (IBWC),[10] and the agreements related to the 2019 Colorado River Drought Contingency Plans (DCPs)[11] as authorized by Public Law 116-14.[12] Each AOP incorporates these and other rules, guidelines,

[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 available online at: https://www.usbr.gov/uc/water/crsp/studies/GCOC.pdf.
[3] Off-stream Storage of Colorado River Water; Development and Release of Intentionally Created Unused Apportionment in the Lower Division States: Final Rule (43 CFR Part 414; 64 *Federal Register* 59006, November 1, 1999). Available online at: https://www.usbr.gov/lc/region/g4000/contracts/FinalRule43cfr414.pdf.
[4] ROD for the Colorado River Interim Surplus Guidelines, January 16, 2001 (67 *Federal Register* 7772, January 25, 2001). Available online at: https://www.usbr.gov/lc/region/g4000/surplus/surplus_rod_final.pdf.
[5] ROD for the Operation of Flaming Gorge Dam, February 16, 2006. Available online at: https://www.usbr.gov/uc/envdocs/rod/fgFEIS/final-ROD-15feb06.pdf.
[6] ROD for Navajo Reservoir Operations, Navajo Unit – San Juan River, New Mexico, Colorado, Utah, July 31, 2006. Available online at: https://www.usbr.gov/uc/envdocs/eis/navajo/pdfs/NavWaterOpsROD2006.pdf.
[7] ROD for Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead (73 *Federal Register* 19873, April 11, 2008). The ROD adopting the 2007 Interim Guidelines was signed by the Secretary on December 13, 2007. Available online at: https://www.usbr.gov/lc/region/programs/strategies/RecordofDecision.pdf.
[8] ROD for the Aspinall Unit Operations, Final Environmental Impact Statement, April 2012. Available online at: https://www.usbr.gov/uc/envdocs/eis/AspinallEIS/ROD.pdf.
[9] ROD for the Glen Canyon Dam Long-Term Experimental and Management Plan Final Environmental Impact Statement, December 2016. Available online at: http://ltempeis.anl.gov/documents/docs/LTEMP_ROD.pdf.
[10] IBWC Minute No. 323, Extension of Cooperative Measures and Adoption of a Binational Water Scarcity Contingency Plan in the Colorado River Basin dated September 21, 2017. Available online at: https://www.ibwc.gov/Files/Minutes/Min323.pdf.
[11] The agreements related to the 2019 Colorado River DCPs, as authorized by Public Law 116-14, were executed on May 20, 2019, and consist of an Upper Basin DCP (Drought Response Operations and Demand Management Storage) and a Lower Basin DCP including Lower Basin Drought Operations. Available online at: https://www.usbr.gov/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.

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

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

Authority

This 2023 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

[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.

commonly and collectively known as the Law of the River.

The 2023 AOP was prepared by Reclamation on behalf of the Secretary, working with other Interior agencies and the Western Area Power Administration (WAPA). Reclamation consulted with the seven Colorado River Basin States Governors' representatives, representatives from Mexico, the Upper Colorado River Commission (UCRC), Native American tribes, other appropriate Federal agencies, representatives of academic and scientific communities, environmental organizations, representatives of the recreation industry, water delivery contractors, contractors for the purchase of Federal power, others interested in Colorado River operations, and the general public through the Colorado River Management Work Group.

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

Purpose

The purpose of the AOP is to report on the past year's operations and illustrate the potential range of reservoir operations that might be expected in the upcoming year, and to determine or address: (1) the quantity of water considered necessary to be in storage in the Upper Basin reservoirs as of September 30, 2023, 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] 323, and 327,[19] of the IBWC; (3) whether the reasonable consumptive use requirements of mainstream users in the Lower Division States will be met under a "Normal," "Surplus," or "Shortage" Condition as outlined in Article III of the Operating Criteria and as implemented by the 2007 Interim Guidelines; (4) whether management and/or operational regimes will be required or considered as described in the 2019 Colorado River DCPs; 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. 327, Emergency Deliveries of Colorado River Waters for use in the city of Tijuana, Baja California dated January 28, 2022. Available online at: https://www.ibwc.gov/Files/Minutes/Min327.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 (WY) as runoff forecasts are adjusted to reflect existing snowpack, basin storage, flow conditions, and as changes occur in projected water deliveries.

Summary of Projected 2023 Operations

Upper Basin. Taking into account (1) the existing water storage conditions in the basin, (2) the August 2022 24-Month Study[21] projection of the most probable near-term water supply conditions in the basin, (3) the concept of operational neutrality as outlined in the Lake Powell annual operating decision in water year 2022 (May 3rd Letter),[22] (4) the concept of preserving the benefits to Glen Canyon Dam facilities and operations in 2023 of the operating decisions made in water year 2022,[23] and (5) Section 6.D.1 of the 2007 Interim Guidelines, the Lower Elevation Balancing Tier will govern the operation of Lake Powell for water year 2023. Subject to decisions regarding preservation of the benefits to Glen Canyon Dam facilities and operations, the August 2022 24-Month Study of the most probable inflow scenario projects the water year 2023 release from Glen Canyon Dam to be 7.00 million acre-feet (maf) (8,630 million cubic meters [mcm]). Given the hydrologic variability of the Colorado River System and consistent with Section 6.D.1 of the 2007 Interim Guidelines, the projected water year release from Lake Powell in 2023 will range from 7.00 maf (8,630 mcm) to 9.50 maf (11,720 mcm). Because the 2022 operations were intended to protect critical elevations at Lake Powell, Reclamation will implement operations to protect these critical elevations and preserve the benefits of the 2022 operations in water year 2023. Specifically, Reclamation modeled Lower Elevation Balancing Tier operations in WY 2023 as follows in the August 24-Month Study:

- The Glen Canyon Dam annual release has initially been set to 7.00 maf (8,630 mcm) and in April 2023 Reclamation will evaluate hydrologic conditions to determine if balancing releases may be appropriate pursuant to the 2007 Interim Guidelines
- Balancing releases will be limited (with a minimum of 7.00 maf (8,630 mcm) to protect Lake Powell from declining below elevation 3,525 feet (1,074.42 meters) at the end of December 2023
- Balancing releases will account for operational neutrality of the 0.480 maf (592 mcm) that was retained in Lake Powell under the May 2022 action. Any Lake Powell balancing release volume will be calculated as if the 0.480 maf (592 mcm) had been delivered to Lake Mead in WY 2022

[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.

[22] More information about Lake Powell's operating decision for water year 2022 is available online: https://www.usbr.gov/uc/DocLibrary/Plans/20220503-2022DROA-GlenCanyonDamOperationsDecisionLetter-508-DOI.pdf.

[23] Information related to water year 2023 information can be found here: https://www.usbr.gov/newsroom/news-release/4294

- The modeling approach for WY 2023 will apply to 2024 for the purposes of the August 24-Month Study

Consistent with the provisions of the 2007 Interim Guidelines, and Reclamation's commitment per the May 3rd letter to preserve the benefits to Glen Canyon Dam facilities from 2022 Operations into 2023 and 2024, Reclamation will consult with the Basin States on monthly and annual operations. Reclamation will also consult with Basin Tribes, the Republic of Mexico, other federal agencies, water users and non-governmental organizations with respect to implementation of these monthly and annual operations.

Reclamation will continue to monitor hydrologic and operational conditions and assess the need for additional responsive actions and changes to operations. Reclamation will continue to consult with the Basin States, Basin Tribes, the Republic of Mexico, and other partners on Colorado River operations to consider and determine whether additional measures should be taken to further enhance the preservation of these benefits, as well as recovery protocols, including those of future protective measures for both Lake Powell and Lake Mead.

For further information about the variability of projected inflow into Lake Powell, see the 2023 Water Supply Assumptions section and the Lake Powell section within the Summary of Reservoir Operations in 2022 and Projected 2023 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, (3) the concept of operational neutrality as outlined in the Lake Powell annual operating decision in water year 2022,[22] and (4) Section 2.D.1 of the 2007 Interim Guidelines, a Shortage Condition, consistent with Section 2.D.1.b, will govern the operation of Lake Mead for calendar year 2023 in accordance with Article III(3)(c) of the Operating Criteria and Article II(B)(3) of the Consolidated Decree. In addition, the Lower Basin Drought Contingency Plan Agreement (LB DCP Agreement) will also govern the operation of Lake Mead for calendar year 2023. 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 2023. Creation and/or delivery of Intentionally Created Surplus (ICS) may be made consistent with Section 3 of the 2007 Interim Guidelines and Sections III and IV of Exhibit 1 to the LB DCP Agreement, as applicable.

No unused apportionment for calendar year 2023 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 2023. Any such allocation shall be made in accordance with Article II(B)(6) of the Consolidated Decree, the Lower Colorado Region Policy for Apportioned but Unused Water[24] (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),[25] the December 15, 2021

[24] Lower Colorado Region Policy for Apportioned but Unused Water, February 11, 2010. Available online at: https://www.usbr.gov/lc/region/g4000/UnusedWaterPolicy.pdf.
[25] Available online at: https://www.usbr.gov/lc/region/programs/PilotSysConsProg/PilotSCPFundingAgreement7-30-2014.pdf.

Memorandum of Understanding (MOU) to maintain the elevation in Lake Mead (the "500 Plus Plan"),[26] and as specified in Section 4.b of the LB DCP Agreement.

In calendar year 2023, 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),[27] which became effective January 1, 2004, will not be in effect during calendar year 2023 because overruns are not permitted in a Shortage Condition. In accordance with Section 2.6.e of the IOPP, further accumulation of inadvertent overruns in calendar year 2023 will be suspended.

Conserved Colorado River water, created through the PSCP,[28] the LB DCP Agreement, the 500 Plus Plan, and other voluntary agreements, is anticipated to be added to Lower Basin reservoirs pursuant to system conservation agreements in the Lower Basin in calendar year 2023.

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 2023 pursuant to the 2007 Interim Guidelines, applicable forbearance and delivery agreements, and the LB DCP Agreement.

Consistent with Section 4 of the 2007 Interim Guidelines, Developed Shortage Supply (DSS) may be created and delivered in calendar year 2023.

1944 United States-Mexico Water Treaty. A volume of 1.430 maf (1,760 mcm) of water will be available to be scheduled for delivery to Mexico during calendar year 2023 in accordance with Article 15 of the 1944 United States-Mexico Water Treaty, IBWC Minutes No. 242 and 327, and Section III.A of IBWC Minute No. 323. The volume delivered may also 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 III.C and Section V of IBWC Minute No. 323.

[26] Available online at: https://www.usbr.gov/lc/region/g4000/2021_MOU.pdf.
[27] 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.
[28] More information about the PSCP in the Lower Basin can be found at: https://www.usbr.gov/lc/region/programs/PilotSysConsProg/pilotsystem.html.

BASINWIDE DROUGHT RESPONSE OPERATIONS

The Colorado River Basin is experiencing a prolonged period of drought and record-low runoff conditions resulting in historically low reservoir levels at Lake Powell and Lake Mead. The period from 2000 through 2022 is the lowest 23-year inflow in the historic record and one of the lowest in the past 1,200 years.[29] As a result of the exceptionally low runoff conditions over the past three years (2020, 2021, and 2022), drought response operations have been triggered at Lake Powell and Lake Mead consistent with the 2007 Interim Guidelines, Minute No. 323, and the 2019 Colorado River DCP agreements.

Upper Basin Drought Response Operations Agreement (DROA)

Reclamation staff have been working with the DROA[30] Parties to develop and implement the 2022 Plan since hydrologic projections in early 2021 indicated that Lake Powell could decline to below DROA's Target Elevation of 3,525 feet (1,074.42 meters). Development of the 2022 Plan involved drafting two components: a Framework document that contains provisions the DROA Parties will use to develop annual Plans and will remain relatively unchanged from year to year, and 2022 attachments to this Framework document to identify the specific operations during the May 2022 through April 2023 period.

In July of 2021, Reclamation initiated an emergency release in accordance with the DROA after advance consultation and coordination with the Upper Division States, through the UCRC, and following consultation with and supporting communication from the Governors' Representatives of the Colorado River Basin States. Additional consultation occurred with WAPA, [31] the National Park Service, and the U.S. Fish and Wildlife Service (USFWS). Under the Emergency Action provision, Reclamation planned to release an additional total of 0.181 maf (223 mcm) in Calendar Year 2021, from Flaming Gorge, Blue Mesa and Navajo reservoirs. Reclamation later modified that plan to release 0.161 maf (199 mcm), based on increased risk of not fully meeting contract deliveries from Navajo Reservoir in water year 2022.

In January of 2022, Reclamation initiated a second DROA action after advanced consultation and coordination with the Upper Division States, through the UCRC, and following consultation with the Governors' Representatives of the Colorado River Basin States. Pursuant to DROA, the first drought response that is considered is the modification of monthly release volumes from Lake Powell while maintaining the annual release volume pursuant to the 2007 Interim Guidelines. Reclamation modified Lake Powell release volumes by reducing the monthly releases from January through April 2022, by a total volume of 0.350 maf (432 mcm). This volume was scheduled to be added back into releases scheduled for June through

[29] Study on the tree-ring reconstruction record for the Upper Colorado River Basin is available online at: https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2007GL029988

[30] Available online at: https://www.usbr.gov/dcp/docs/final/Attachment-A1-Drought-Response%20Operations-Agreement-Final.pdf.

[31] Per Interagency Agreement No. 19-WC-40-746, section 2.5, "Reclamation will ensure WAPA is given a meaningful opportunity to participate," including the opportunity to participate in the potential development of a drought response operations plan.

September 2022; however, in May 2022, the Department of the Interior modified the annual release volume from Lake Powell from 7.48 maf (9,230 mcm) to 7.00 maf (8,630 mcm), in accordance with Sections 6 and 7.D of the 2007 Interim Guidelines.
In April of 2022, the DROA parties finalized the 2022 Plan for the duration of May 2022 through April 2023.[32] The Secretary of the Interior through her designee approved the 2022 Plan on April 29, 2022,[33] as summarized and including the following key operational elements:

1. Drought Response Operations releases of approximately 0.500 maf (617 mcm) from Flaming Gorge Dam

2. Possible Drought Response Operations releases from Blue Mesa Reservoir in Fall 2022 and Winter 2023, contingent upon available release volumes

3. Possible Drought Response Operations releases from Navajo Reservoir in Fall 2022 or Winter 2023, contingent upon available release volume

4. Possible operational adjustments at Glen Canyon Dam in Winter 2023

5. No anticipated recovery of DROA release volumes through the term of the 2022 Plan

On July 18, 2022, the UCRC sent a letter to the Department of the Interior through Reclamation Commissioner Touton to inform Reclamation of its 5-Point Plan in response to Commissioner Touton's challenge to find 2 to 4 million acre-feet of water in the next two years. In that letter, the UCRC indicated that the Upper Division States intend to commence development of a 2023 Drought Response Operations Plan (2023 Plan) in August 2022, with finalization in April 2023 consistent with the Drought Response Operations Plan Framework (Framework). A 2023 Plan must meet all the requirements of the Drought Response Operations Agreement and the Framework.[34]

2022 Powell Release Reduction; Operational Neutrality and Protection of the Glen Canyon Dam Facilities and Operations

In light of the prolonged drought, low runoff conditions, and depleted storage at Lake Powell, the Department of the Interior, in consultation with the Basin States and others, implemented an action under Sections 6 and 7.D of the 2007 Interim Guidelines specifically reducing the Glen Canyon Dam annual release from 7.48 maf (9,230 mcm) to 7.00 maf (8,630 mcm) in water year 2022. This action, based on the May 3rd Letter, was undertaken in conjunction with 2022 DROA actions resulting in adding approximately one million additional acre-feet (1,230 mcm) of storage, or 16.00 feet (4.88 meters) of pool elevation, by April 2023.

[32] Drought Response Operations Framework and Plan: https://www.usbr.gov/uc/DocLibrary/Plans/20220420-2022DroughtResponseOperationsPlan-Signed-508-UCRO.pdf.
[33] Department of Interior Approval Memo: https://www.usbr.gov/uc/DocLibrary/Plans/20220429-2022DroughtResponseOperationsPlan-ApprovalMemo-508-DOI.pdf.
[34] The UCRC letter can be found here: http://www.ucrcommission.com/wp-content/uploads/2022/07/2022-July-18-Letter-to-Reclamation.pdf

The reduction of releases from Lake Powell from 7.48 maf (9,230 mcm) to 7.00 maf (8,630 mcm)in water year 2022 will result in a reduced release volume of 0.480 maf (592 mcm) that, consistent with operations under the 2007 Interim Guidelines, normally would have been released from Glen Canyon Dam to Lake Mead as part of the 7.48 maf (9,230 mcm) annual release volume. The reduction of releases from Glen Canyon Dam in water year 2022 (resulting in increased storage in Lake Powell) will not affect future operating determinations and will be accounted for "as if" this volume of water had been delivered to Lake Mead. The August 2022 24-Month Study modeled Lake Powell and Lake Mead as if the 0.480 maf (592 mcm) had been delivered to Lake Mead for operating tier/condition purposes both for the U.S. Lower Basin and for Mexico. Actual delivery and final accounting of this volume of water will take place at a later date in consultation with the Basin States, Basin Tribes, and Mexico.

Lower Basin MOU – 500 Plus Plan

The August 2021 24-Month Study Minimum Probable inflow scenario projected that Lake Mead's elevation will be below elevation 1,030 feet (313.9 meters) in July 2023. Consistent with Section V.B.2 of Exhibit 1 to the Lower Basin DCP, this projection triggered consultation among the Secretary and Lower Division States to determine what additional measures will be taken to avoid and protect against the potential for Lake Mead to decline below 1,020 feet (310.9 meters). Consistent with this provision, in December 2021, a Lower Basin MOU established a cooperative effort commonly referred to as the "500 Plus Plan" to facilitate near-term actions to maintain the water surface elevation of Lake Mead. The 500 Plus Plan aims to generate an additional 0.500 maf (617 mcm) of voluntary conservation each calendar year in 2022 and 2023, relative to the June 2021 24-Month Study modeling assumptions, in addition to the required shortage reductions and DCP contributions under the 2007 Interim Guidelines and Lower Basin DCP Agreement, respectively. As of October 2022, approximately 0.417 maf (514 mcm) is projected to be conserved through calendar year 2023 in accordance with the 500 Plus Plan.[35] Reclamation will continue working with the Lower Basin to enter into agreements for system conservation water that can be applied towards the 500 Plus Plan.

Supplemental Environmental Impact Statement (SEIS)

As directed by the Secretary, on November 17, 2022, Reclamation published a Federal Register Notice indicating its intent to prepare a SEIS.[36] The purpose of the SEIS is to supplement the Environmental Impact Statement completed in 2007 for the 2007 Interim Guidelines in order to modify operating guidelines for the operation of Glen Canyon and Hoover Dam to address the historic drought and low runoff conditions in the Colorado River Basin. The need for the revised operating guidelines is based on the potential that continued low runoff conditions in the Colorado River Basin could lead to critically low reservoir conditions at Lake Powell and Lake Mead that impact both water delivery and hydropower operations in 2023 and 2024. While it is premature at this time to identify any potential changes to Glen Canyon Dam or

[35] The yearly accounting for the 500 Plus Plan volumes will be reflected in Reclamation's water accounting report. The water accounting reports are available online at: https://www.usbr.gov/lc/region/g4000/wtracct.html.
[36] Federal Register Notice available online at: https://www.federalregister.gov/documents/2022/11/17/2022-25004/notice-of-intent-to-prepare-a-supplemental-environmental-impact-statement-for-december-2007-record.

Hoover Dam operations, potential changes to such operations may be adopted and implemented in 2023 or subsequent years.

2022 HYDROLOGY SUMMARY AND RESERVOIR STATUS

Much below average streamflows[37] were observed throughout much of the Colorado River Basin during water year 2022. Unregulated[38] inflow to Lake Powell in water year 2022 was 6.08 maf (7,500 mcm), or 63 percent of the 30-year average[39] which is 9.60 maf (11,840 mcm). Unregulated inflow to Flaming Gorge, Blue Mesa, and Navajo Reservoirs was 64, 71, and 63 percent of average, respectively.

Precipitation in the Upper Colorado River Basin was median[40] during water year 2022. On September 30, 2022, the cumulative precipitation received within the Upper Colorado River Basin for water year 2022 was 100 percent of median.

Snowpack conditions trended below average across most of the Colorado River Basin throughout the snow accumulation season. The basinwide snow water equivalent measured 96 percent of the median peak on March 24, 2022, which is around two weeks earlier than the peak seasonal accumulation day of April 6. On April 1, 2022, the snow water equivalents for the Green River, Upper Colorado River Headwaters, and San Juan River Basins were 75, 89, and 103 percent of median, respectively.

During the 2022 spring runoff period, inflows to Lake Powell peaked on June 3, 2022 at approximately 28,300 cubic feet per second (cfs) (800 cubic meters per second [cms]). The April through July unregulated inflow volume for Lake Powell was 3.75 maf (4,630 mcm) which was 59 percent of average.

Lower Basin tributary inflows above Lake Mead were near average/median for water year 2022. Tributary inflow measured at the Little Colorado River near Cameron gage for water year 2022 totaled 0.164 maf (202 mcm), or 139 percent of average. Tributary inflow measured

[37] Streamflow statistics throughout this document are provided by the National Weather Service's Colorado Basin River Forecast Center and are based on the average/median for the 30-year period 1991-2020, unless otherwise noted. Hydrologic conditions are described in the following manner: much above average/median (greater than 130%), above average/median (111%-130%), near average/median (90%-110%), below average/median (70%-89%), and much below average/median (less than 70%). Reservoir specific ROD descriptions are used in place of this terminology where applicable.

[38] 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.

[39] Inflow statistics throughout this document will be compared to the mean of the 30-year period 1991-2020, unless otherwise noted.

[40] Snowpack, snow water equivalent and precipitation statistics throughout this document are provided by the Natural Resources Conservation Service and are based on the median for the 30-year period 1991-2020, unless otherwise noted. Hydrologic conditions are described in the following manner: much above average/median (greater than 130%), above average/median (111%-130%), near average/median (90%-110%), below average/median (70%-89%), and much below average/median (less than 70%). Reservoir specific ROD descriptions are used in place of this terminology where applicable.

at the Virgin River at Littlefield gage for water year 2022 totaled 0.115 maf (142 mcm), or 67 percent of average.

Below Hoover Dam, tributary inflow for water year 2022 measured at the Bill Williams River below Alamo Dam gage totaled 0.018 maf (22 mcm), and tributary inflow measured at the Gila River near Dome gage totaled 0.007 maf (9 mcm).[41]

The Colorado River total system storage experienced a net decrease of 3.38 maf (4,170 mcm) in water year 2022. Reservoir storage in Lake Powell decreased during water year 2022 by 1.46 maf (1,800 mcm). Reservoir storage in Lake Mead decreased during water year 2022 by 1.69 maf (2,080 mcm). At the beginning of water year 2022 (October 1, 2021), Colorado River total system storage was 38 percent of capacity. As of September 30, 2022, total system storage was 33 percent of capacity.

Tables 1 and 2 list the October 1, 2022, reservoir vacant space, live storage, water elevation, percent of capacity, change in storage, and change in water elevation during water year 2022.

[41] 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.

Table 1. Reservoir Conditions on October 1, 2022 (English Units)

Reservoir	Vacant Space	Live Storage	Water Elevation	Percent of Capacity	Change in Storage	Change in Elevation
	(maf)	(maf)	(ft)	(%)	(maf)	(ft)
Fontenelle	0.065	0.274	6,498.08	82	0.044	6.3
Flaming Gorge	0.991	2.68	6,013.01	73	-0.270	-6.1
Blue Mesa	0.533	0.292	7,446.72	35	0.051	10.1
Navajo	0.776	0.872	6,020.65	53	-0.031	-3.4
Lake Powell	17.52	5.80	3,529.33	25	-1.46	-16.0
Lake Mead	18.79	7.33	1,045.03	28	-1.69	-22.7
Lake Mohave	0.215	1.60	639.17	88	0.030	1.1
Lake Havasu	0.040	0.579	447.96	94	-0.010	-0.5
Totals	38.93	19.42		33	-3.38	

Table 2. Reservoir Conditions on October 1, 2022 (Metric Units)

Reservoir	Vacant Space	Live Storage	Water Elevation	Percent of Capacity	Change in Storage	Change in Elevation
	(mcm)	(mcm)	(m)	(%)	(mcm)	(m)
Fontenelle	81	338	1,980.61	82	54	1.9
Flaming Gorge	1,223	3,310	1,832.77	73	-333	-1.9
Blue Mesa	658	360	2,269.76	35	63	3.1
Navajo	958	1,080	1,835.09	53	-39	-1.0
Lake Powell	21,610	7,150	1,075.74	25	-1,800	-4.9
Lake Mead	23,180	9,040	318.53	28	-2,082	-6.9
Lake Mohave	265	1,970	194.82	88	37	0.3
Lake Havasu	49	714	136.54	94	-12	-0.2
Totals	48,020	23,950		33	-4,170	

2023 WATER SUPPLY ASSUMPTIONS

For 2023 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 2023 is 4.70 maf (5,800 mcm), or 49 percent of average.
- The forecasted most probable unregulated inflow to Lake Powell in water year 2023 is 8.30 maf (10,240 mcm), or 86 percent of average.
- The forecasted maximum probable unregulated inflow to Lake Powell in water year 2023 is 15.70 maf (19,370 mcm), or 163 percent of average.

Projected unregulated inflow volumes[42] 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 2017 through December 2021, 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 2023 is 0.633 maf (781 mcm), the most probable inflow is 0.810 maf (999 mcm), and the maximum probable inflow is 1.02 maf (1,260 mcm).

The projected monthly volumes of inflow were input into the 24-Month Study and used to project potential reservoir operations for 2023. Starting with the August 2022 24-Month Study projection of the October 1, 2023 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:

[42] 24-Month Study projections using the CBRFC unregulated inflow forecast do not represent the full range of future possibilities that could occur with different scenarios. For more information, please see the Colorado River Modeling website online at: https://www.usbr.gov/lc/region/g4000/riverops/coriver-projections.html.

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 2023 (English Units)[43]

Time Period	Minimum Probable (maf)	Most Probable (maf)	Maximum Probable (maf)
10/2022 – 12/2022	0.72	1.03	1.65
1/2023 – 3/2023	0.55	1.01	1.94
4/2023 – 7/2023	3.08	5.63	10.86
8/2023 – 9/2023	0.35	0.65	1.25
10/2023 – 12/2023	1.01	1.23	1.55
Water Year 2023	4.70	8.32	15.70
Calendar Year 2023	4.99	8.52	15.60

Table 4. Projected Unregulated Inflow into Lake Powell for Water Year 2023 (Metric Units)

Time Period	Minimum Probable (mcm)	Most Probable (mcm)	Maximum Probable (mcm)
10/2022 – 12/2022	890	1,270	2,040
1/2023 – 3/2023	680	1,250	2,390
4/2023 – 7/2023	3,800	6,940	13,400
8/2023 – 9/2023	430	800	1,540
10/2023 – 12/2023	1,250	1,520	1,910
Water Year 2023	5,800	10,260	19,370
Calendar Year 2023	6,160	10,510	19,240

[43] All values in Tables 3 and 4 are projected inflows based upon the August 2022 CBRFC forecast. The CBRFC Most Probable forecast is issued as monthly values. The CBRFC Minimum and Maximum Probable forecasts are issued as water year totals, which Reclamation disaggregates to monthly values using monthly proportions of the 10th and 90th percentiles, respectively, of the 1991-2020 unregulated inflow.

SUMMARY OF RESERVOIR OPERATIONS IN 2022 AND PROJECTED 2023 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)[44] 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 considering the Upper Colorado River Endangered Fish Recovery Program (UCRIP),[45] the San Juan River Basin Recovery Implementation Program (SJRIP),[46] 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 USFWS, 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 2022 and the range of probable projected 2023 operations of each of the reservoirs with respect to applicable provisions of compacts, the Consolidated Decree, statutes, regulations, contracts, agreements, and instream flow needs for maintaining or improving aquatic and riparian resources where appropriate.

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

Fontenelle Reservoir

Reservoir storage in Fontenelle increased during water year 2022. At the beginning of water year 2022, Fontenelle storage was 69 percent of live capacity at elevation 6,491.82 feet (1,978.71 meters), with 0.230 maf (284 mcm) in storage. The unregulated inflow to Fontenelle during water year 2022 was 0.744 maf (917 mcm) which is 69 percent of average. At the end of the water year, September 30, 2022, Fontenelle storage was at 82 percent of live capacity at elevation 6,498.08 feet (1,980.61 meters), with a storage of 0.274 maf (338 mcm) resulting in a net increase during water year 2022 of 0.044 maf (54 mcm).

Hydrologic conditions in the Upper Green River Basin above Fontenelle were below average in water year 2022. Snowpack development tracked below median with below average fall conditions resulting in a below average runoff forecast. Peak snow water equivalent reached 82 percent of seasonal median on April 18, 2022. The observed inflow during the April to July season was 0.449 maf (553 mcm), or 61 percent of average.

Fontenelle Reservoir storage peaked at 98 percent of full capacity in water year 2022. The reservoir elevation peaked at 6,504.95 feet (1,982.71 meters) on July 22, 2022, which was 1.06 feet (0.32 meters) below the spillway crest. Daily inflow peaked at 8,090 cfs (229 cms) on June 15, 2022. 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. Due to the below average hydrologic conditions, there was a small spring peak release at Fontenelle Reservoir.

Based on the August 2022 24-Month Study, the most probable April through July inflow for Fontenelle Reservoir during water year 2023 is 0.635 maf (783 mcm) or 86 percent of average. This volume exceeds the 0.334 maf (412 mcm) live 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 2023. In order to minimize high spring releases and to maximize downstream water resources and power production, the reservoir will most likely be drawn down to about elevation 6,468.88 feet (1,971.71 meters) by late March, which is 5.88 feet (1.79 meters) above the minimum operating level, and corresponds to a volume of 0.114 maf (140 mcm) of live storage.

Beginning October 1, 2020, the area-capacity table for Fontenelle Reservoir was updated based on a 2010 and 2019 Reclamation Survey. The live capacity decreased from 0.345 maf (426 mcm) to 0.334 maf (412 mcm). The active capacity decreased from 0.264 maf (326 mcm) to 0.257 maf (317 mcm).

Flaming Gorge Reservoir

Reservoir storage in Flaming Gorge decreased during water year 2022. At the beginning of water year 2022, Flaming Gorge storage was 82 percent of live capacity at elevation 6,019.15 feet (1,834.64 meters), with 2.95 maf (3,640 mcm) in storage. The unregulated inflow to Flaming Gorge during water year 2022 was 0.900 maf (1,110 mcm) which is 64 percent of average. At the end of the water year, Flaming Gorge storage was at 74 percent of live capacity

at elevation 6,013.01 feet (1,832.77 meters), with 2.68 maf (3,310 mcm) resulting in a net decrease during water year 2022 of 0.270 maf (333 mcm).

Spring period hydrologic classification in the Upper Green River Basin above Flaming Gorge was moderately dry in water year 2022 where the snowpack tracked below median with below average fall conditions resulting in below average runoff forecasts. Peak snow water equivalent reached 83 percent of seasonal median on April 18, 2022. The May forecast for the April through July inflow into Flaming Gorge Reservoir was 0.550 maf (678 mcm), or 57 percent of average. The observed inflow during the spring runoff season was 0.539 maf (665 mcm), or 56 percent of average. Observed flow volumes from the Yampa River Basin fell into the moderately dry hydrologic condition.

A 2022 Plan[47] was approved by the Upper Division States, the Upper Colorado River Commission, and the Department of the Interior. Per the 2022 Plan an additional 0.500 maf (617 mcm) is scheduled to be delivered from Flaming Gorge Reservoir from May 2022 through April 2023 to Lake Powell.

The Flaming Gorge Operation Plan for May 2022 through April 2023 (FG-Ops) has been developed and approved by Reclamation and includes the 2022 Plan. The FG-Ops outlines two of the three UCRIP flow requests.[48] The moderately dry scenario includes the Larval Trigger Study Plan (LTSP) spring release (spring release based on a biological trigger)[49] and the smallmouth bass (SMB) flow spike (to disrupt the spawning success of non-native smallmouth bass).[50]

Spring releases were timed with a biological trigger. After public notification, releases from Flaming Gorge Dam were increased to full powerplant capacity 4,600 cfs (130 cms) and full bypass capacity 4,000 cfs (113 cms) on May 25, 2022 for eleven days then ramped down by 2,000 cfs/day (56.6 cms/day) to 850 cfs (24.1 cms). Yampa River flows at the Deerlodge gage during the spring peak releases peaked at 11,300 cfs (320 cms) on May 20, 2022. The peak release from Flaming Gorge Dam occurred after the Yampa River peak. Flows measured on the Green River at the Jensen, Utah gage reached levels at or above 8,300 cfs (235 cms) for 33 days on May 10, 2022, with a peak of 16,600 cfs (470 cms) on May 31, 2022. The spring peak release in Reach 2 for this hydrologic classification is greater than or equal to 8,300 cfs (235 cms) for 7 or more days.

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[47] Drought Response Operations Framework and Plan: https://www.usbr.gov/uc/DocLibrary/Plans/20220420-2022DroughtResponseOperationsPlan-Signed-508-UCRO.pdf.

[48] The adaptive management process will rely on ongoing or added Recovery Program activities for monitoring and studies to test the outcomes of modifying the flows and release temperatures from Flaming Gorge Dam. ROD Operation of Flaming Gorge Dam Final Environmental Impact Statement, February 2006. Available online at: https://www.usbr.gov/uc/envdocs/rod/fgFEIS/final-ROD-15feb06.pdf

[49] 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.

[50] Smallmouth bass flow spike study plan titled: Evaluate effects of flow spikes to disrupt reproduction of smallmouth bass in the Green River downstream of Flaming Gorge Dam. K.R. Bestgen, 2018. Available online at: https://www.coloradoriverrecovery.org/documents-publications/technical-reports/isf/Bestgen2018Smallmouth%20bass%20study%20planNovember2018.pdf.

The releases for the SMB flow spike began increasing to full powerplant capacity on June 21, 2022. Full power plant releases, 4,600 cfs (130 cms), were sustained for 3 days (June 21-24, 72 hours) followed by a 2-day ramp down at a maximum of 2,000 cfs/day (56.6 cms/day) that concluded the experiment early June 26.

In water year 2022, Flaming Gorge Reservoir was operated in accordance with the 2006 Flaming Gorge ROD. The April through July observed unregulated inflow resulted in a moderately dry hydrologic classification. Due to spring flows being greater than 14,000 cfs for more than 4 days in Reach 2, per the 2022 Plan, an average hydrologic operation was conducted for summer, autumn, and winter base flow. These releases are within the 2000 Flow and Temperature Recommendations range of 1,500 cfs (42.4 cms) to 2,400 cfs (67.9 cms) at Reach 2 including being within the +/-40 percent range flexibility. Summer base flow average daily releases ranged from 1,100 cfs (31.3 cms) to 1,940 cfs (54.9 cms). Winter base flow releases are projected to be 1,600 cfs (45.3 cms) to approximately 1,700 cfs (48.1 cms). Daily base flows will likely fluctuate during the winter in response to hydropower needs during December through February.

A spring peak release is projected to occur in May or June 2023 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 UCRIP LTSP.

Based on the August 2022 24-Month Study, the most probable April through July unregulated inflow scenario for Flaming Gorge Reservoir during water year 2023 is 0.830 maf (1,020 mcm), or 86 percent of average. The peak elevation is expected to be approximately 6,012.35 feet (1,832.56 meters) near mid-July 2023. By the end of water year 2023, Flaming Gorge Reservoir is projected to be at elevation 6,012.08 feet (1,832.48 meters), with a storage of 2.65 maf (3,270 mcm), or 73 percent of live capacity.

Under the minimum probable 2023 April through July inflow forecast of 0.467 maf (576 mcm), a 4,600 cfs (130 cms) 2023 spring peak release will be implemented. Under the maximum probable 2023 April through July inflow forecast of 1.61 maf (1,980 mcm), an 8,600 cfs (243 cms) spring peak release will be implemented.

The UCRIP, in coordination with Reclamation, USFWS, 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.

Beginning May 1, 2022, the area-capacity table for Flaming Gorge Reservoir was updated based on a 2019 and 2020 Reclamation Survey. The live capacity decreased from 3.75 maf (4,620 mcm) to 3.67 maf (4,530 mcm). The active capacity decreased from 3.52 maf (4,340 mcm) to 3.43 maf (4,240 mcm). Due to potential impacts from DROA releases, Reclamation conducted a survey in June 2022 of boat ramps, marinas and related infrastructure in Flaming Gorge Reservoir.

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

Reservoir storage content in Blue Mesa increased during water year 2022. At the beginning of water year 2022, Blue Mesa storage content was 53 percent of live capacity at elevation 7,436.58 feet (2,266.67 meters), with 0.241 maf (297 mcm) in storage. The unregulated inflow to Blue Mesa during water year 2022 was 0.639 maf (788 mcm), which was 71 percent of average. At the end of the water year, Blue Mesa storage content was 34 percent of live capacity at elevation 7,443.57 feet (2,268.80 meters), with 0.275 maf (339 mcm) resulting in a net increase during water year 2022 of 0.034 maf (42 mcm).

Near average snowpack conditions occurred during the winter months of water year 2022 in the Gunnison River Basin. Snow measurement sites in the basin reported above to near median seasonal snow water equivalent levels throughout the winter and into the spring of 2022 resulting in an April 1, 2022 snow water equivalent for the Gunnison River Basin that was 103 percent of median, using the 1991-2020 hydrologic period of record.

The fall through winter releases from Crystal Dam were consistently near 350 cfs (9.9 cms) after the Gunnison Tunnel ended diversions for irrigation season on November 1, 2021. On March 21, 2022, releases from Crystal Dam were increased for the 2022 irrigation season as operation of the Gunnison Tunnel began diverting 200 cfs (5.7 cms). Flows through the Black Canyon were maintained within the range of approximately 350 cfs (9.9 cms) to approximately 475 cfs (13.4 cms) until May 14, 2022.

The May 2022 final forecast[51] for the unregulated inflow to Blue Mesa for the April through July runoff period was 0.490 maf (604 mcm), which was 77 percent of average. This forecast was used to establish the hydrologic category for water year 2022 as moderately dry with a peak flow target established for the Whitewater reach of the Gunnison River of 5,000 cfs (141.5 cms) for 1 day.

On May 14, 2022, 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[52]. These releases targeted 24-hour peak flows of 5,000 cfs (141.5 cms) in the Whitewater reach and 2,410 cfs (68.2 cms) in the Black Canyon. During spring peak operations, flows measured in the Whitewater Reach of the Gunnison River achieved an average daily peak flow of 5,750 cfs (163 cms) on May 19, 2020. Releases from Crystal Dam on May 18 and 19, 2020 resulted in a 24-hour average peak flow through the Black Canyon and the Gunnison River Gorge of 2,745 cfs (77.7 cms) as measured at the streamgage located on the Gunnison River below the Gunnison Tunnel. Gunnison River flows in the Black Canyon met or exceeded the flows described in the Black Canyon Water Right Decree.

[51] The term "final forecast" or "official forecast" refers to the CBRFC runoff forecast for unregulated inflow into CRSP reservoirs that is received by Reclamation during the first few business days of each month.
[52] Decree quantifying the Federal Reserved Water Right for Black Canyon of the Gunnison National Park (State of Colorado District Court, Water Division Four, Case Number 01CW05), signed on December 31, 2008.

For water year 2023, the Aspinall Unit will be operated in compliance with the 2012 Aspinall ROD, including all required consultations and consistent with applicable law, while maintaining and continuing to meet its Congressionally authorized purposes.

Based on the August 2022 24-Month Study, the projected most probable unregulated inflow for water year 2023 into Blue Mesa Reservoir is 0.820 maf (1,011 mcm), or 91 percent of average. The reservoir is expected to reach a seasonal low elevation of 7,433.21 feet (2,265.64 meters) in October 2022. The peak elevation is expected to be approximately 7,488.55 feet (2,282.51 meters) near the end of July 2023. By the end of water year 2023, Blue Mesa Reservoir is projected to be at elevation 7,481.20 feet (2,280.27 meters), with a storage content of 0.511 maf (630 mcm), or 62 percent of capacity.

Under the minimum probable 2023 April through July inflow forecast of 0.347 maf (428 mcm), there will be 1-day spring peak release during the spring of 2023. Under the maximum probable 2023 April through July inflow forecast of 0.911 maf (1,124 mcm), a 10-day spring peak release will be implemented as described in the 2012 Aspinall ROD for water year 2023.

Beginning October 1, 2020, the area-capacity table for Blue Mesa Reservoir was updated based on a 2017 Reclamation Survey. The live capacity decreased from 0.832 maf (1,030 mcm) to 0.830 maf (1,020 mcm). The active capacity remained unchanged in the new survey at 0.748 maf (923 mcm).

Navajo Reservoir

Storage in Navajo Reservoir decreased during water year 2022. At the beginning of water year 2022, Navajo storage was 55 percent of live capacity at elevation 6,024.05 feet (1,836.13 meters), with 0.903 maf (1,110 mcm) in storage. The modified unregulated inflow[53] to Navajo during water year 2022 was 0.574 maf (708 mcm), or 63 percent of average. At the end of the water year, Navajo storage was at 53 percent of live capacity at elevation 6,020.65 feet (1,835.09 meters), with 0.872 maf (1,080 mcm) resulting in a net decrease during water year 2022 of 0.031 maf (39 mcm).

Reservoir storage in Navajo decreased throughout water year 2022 peaking at an elevation of 6,029.43 feet (1,837.77 meters) on May 24, 2022. This was 55.57 feet (16.94 meters) below full pool. The April through July modified unregulated inflow into Navajo Reservoir in water year 2022 was 0.382 maf (471 mcm), or 61 percent of average.

The San Juan Flow Recommendations,[54] completed by the SJRIP in May 1999, provide flow recommendations that promote the recovery of the endangered CPM and razorback sucker, maintain important habitat for these two species as well as the other native species, and provide information for the evaluation of continued water development in the basin. In water year 2022, Navajo Reservoir operated under the SJRIP and Reclamation's interim operations.

[53] 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.
[54] 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.

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 2022, including targeting the SJRIP's recommended base flows. The target base flow was calculated using the weekly average of gaged flows throughout the critical habitat area from Farmington to Lake Powell. Based on the SJRIP and Reclamation's interim operations for water year 2022, there was no spring peak release at Navajo Reservoir.

During water year 2023, Navajo Reservoir will be operated in accordance with the 2006 Navajo Reservoir ROD. Navajo Reservoir storage levels are expected to be below average in 2023 under the most probable inflow forecast. Base releases from the reservoir will likely range from 250 cfs (7.07 cms) to 600 cfs (17.0 cms) through the winter. Based on the August 2022 most probable April through July modified unregulated inflow forecast of 0.583 maf (719 mcm) in 2023, the August 2022 24-Month Study projects no spring peak release would be recommended by the SJRIP and Reclamation's interim operations for water year 2023. The reservoir is projected to reach a peak elevation of 6,049.12 feet (1,843.77 meters) in June 2023. The reservoir is projected to reach a minimum elevation of 6,020.79 feet (1,835.14 meters) in October 2022.

Under the minimum probable 2023 April through July inflow forecast of 0.281 maf (346 mcm), there will be no spring peak release during the spring of 2023. Under the maximum probable 2023 April through July inflow forecast of 1.01 maf (1,240 mcm), a 51-day spring peak release will be recommended as described by SJRIP and Reclamation's interim operations for water year 2023.

Beginning October 1, 2021, the area-capacity table for Navajo Reservoir was updated based on a 2019 Reclamation Survey. The live capacity decreased from 1.70 maf (2,100 mcm) to 1.65 maf (2,035 mcm). The active capacity decreased from 1.04 maf (1,280 mcm) to 1.02 maf (1,260 mcm).

Lake Powell

Reservoir storage in Lake Powell decreased during water year 2022. At the beginning of water year 2022, Lake Powell storage was 34 percent of live capacity at elevation 3,545.36 feet (1,080.63 meters), with 7.26 maf (8,950 mcm) in storage. The unregulated inflow to Lake Powell during water year 2022 was 6.08 maf (7,500 mcm) which is 63 percent of average. At the end of the water year, Lake Powell storage was at 25 percent of live capacity at elevation

3,529.33 feet (1,075.74 meters), with 5.80 maf (7,150 mcm) resulting in a net decrease during water year 2022 of 1.46 maf (1,800 mcm).

The August 2021 24-Month Study was run to project the January 1, 2022, elevations of Lake Powell and Lake Mead and determine the water year 2022 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, 2022, reservoir elevations of Lake Powell and Lake Mead were projected to be 3,535.40 feet (1,077.59 meters) and 1,065.85 feet (324.87 meters), respectively. Given these projections, the annual release volume from Lake Powell during water year 2022 was consistent with the Mid-Elevation Release Tier (Section 6.C.1 of the 2007 Interim Guidelines), calling for 7.48 maf (9,230 mcm).

As discussed in the Basinwide Drought Response Operations section above, in light of the prolonged drought, low runoff conditions, and depleted storage at Lake Powell, the Department of the Interior, in consultation with the Basin States and others, implemented an action under Sections 6 and 7.D of the 2007 Interim Guidelines specifically reducing the Glen Canyon Dam annual releases to 7.00 maf (8,630 mcm) in water year 2022.

The April through July unregulated inflow to Lake Powell in water year 2022 was 3.75 maf (4,630 mcm) which was 59 percent of average. During the 2022 April through July runoff period, Lake Powell's water surface elevation peaked on July 3, 2022, at 3,539.84 feet (1,078.94 meters), which was 160.16 feet (48.82 meters) below full pool. This elevation corresponds to a live storage content of 6.44 maf (7,940 mcm).

In water year 2022, Glen Canyon Dam was operated in compliance with the LTEMP ROD. The fourth Macroinvertebrate Production Flow (bug flow) experiment under the LTEMP was designed and conducted during May through August 2022. During these four experiments, releases were held steady during Saturday and Sunday for the purpose of increasing production of aquatic insects. The total annual release from Glen Canyon Dam in water year 2022 did not change as a result of the experimental releases.

The ten-year total flow of the Colorado River at Lee Ferry[55] for water years 2013 through 2022 is 85.58 maf (105,560 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.

Beginning July 1, 2022, the area-capacity table for Lake Powell Reservoir was updated based on a 2017 and 2018 Reclamation Survey. The live capacity decreased from 24.32 maf (30,000 mcm) to 23.31 maf (28,760 mcm). The total capacity decreased from 26.22 maf (32,340 mcm) to 25.03 maf (30,870 mcm).

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

2023 Operating Tier and Projected Operations for Glen Canyon Dam.

The January 1, 2023 reservoir elevations of Lake Powell and Lake Mead, as adjusted to reflect operational neutrality as outlined in the Lake Powell annual operating decision in water year 2022,[56] are projected under the most probable inflow scenario, with an 8.23 maf (10,150 mcm) release pattern in water year 2023, to be 3,505.66 feet (1,068.53 meters) and 1,047.61 feet (319.31 meters), respectively, based on the August 2022 24-Month Study. Given these projections, the operating tier and annual release volume from Lake Powell during water year 2023 will be consistent with the Lower Elevation Balancing Tier (Section 6.D.1 of the 2007 Interim Guidelines) and, under Section 6.D.1, when the projected January 1 Lake Powell elevation is below 3,525 feet (1,074.42 meters), the Secretary shall balance the contents of Lake Mead and Lake Powell, but shall release not more than 9.5 maf (11,720 mcm) and not less than 7.0 maf (8,630 mcm) from Lake Powell in the water year. Subject to decisions regarding preservation of the benefits to Glen Canyon Dam facilities and operations, the August 2022 24-Month Study of the most probable inflow scenario projects the water year 2023 release from Glen Canyon Dam to be 7.00 maf (8,630 mcm). Given the hydrologic variability of the Colorado River System and consistent with Section 6.D.1 of the 2007 Interim Guidelines, the projected water year release from Lake Powell in 2023 will range from 7.00 maf (8,630 mcm) to 9.50 maf (11,720 mcm). Because the 2022 operations were intended to protect critical elevations at Lake Powell, Reclamation will implement operations to protect these critical elevations and preserve the benefits of the 2022 operations in water year 2023. Specifically, Reclamation modeled Lower Elevation Balancing Tier operations in WY 2023 as follows in the August 24-Month Study:

- The Glen Canyon Dam annual release has initially been set to 7.00 maf (8,630 mcm), and in April 2023 Reclamation will evaluate hydrologic conditions to determine if balancing releases may be appropriate under the conditions established in the 2007 Interim Guidelines
- Balancing releases will be limited (with a minimum of 7.00 maf (8,630 mcm)) to protect Lake Powell from declining below elevation 3,525 feet (1,074.42 meters) at the end of December 2023
- Balancing releases will account for operational neutrality of the 0.480 maf (592 mcm) that was retained in Lake Powell under the May 2022 action.1 Any Lake Powell balancing release volume will be calculated as if the 0.480 maf (592 mcm) had been delivered to Lake Mead in WY 2022
- The modeling approach for WY 2023 will apply to WY 2024 for the purposes of the August 24-Month Study

In accordance with the May 3rd Letter, consistent with the provisions of the 2007 Interim Guidelines, and to preserve the benefits to Glen Canyon Dam facilities from 2022 Operations into 2023 and 2024, Reclamation will consult with the Basin States on monthly and annual operations. Reclamation will also ensure all appropriate consultation with Basin Tribes, the

[56] More information about Lake Powell's operating decision for water year 2022 is available online: https://www.usbr.gov/uc/DocLibrary/Plans/20220503-2022DROA-GlenCanyonDamOperationsDecisionLetter-508-DOI.pdf.

Republic of Mexico, other federal agencies, water users and non-governmental organizations with respect to implementation of these monthly and annual operations.

Reclamation will continue to carefully monitor hydrologic and operational conditions and assess the need for additional responsive actions and/or changes to operations. Reclamation will continue to consult with the Basin States, Basin Tribes, the Republic of Mexico, and other partners on Colorado River operations to consider and determine whether additional measures should be taken to further enhance the preservation of these benefits, as well as recovery protocols, including those of future protective measures for both Lake Powell and Lake Mead.

Maintenance of the eight generating units at Glen Canyon Dam requires them to be taken out of service, in pairs, once each year for approximately one month. Additionally, in water years 2020 through 2023, all four transformers will be replaced, requiring the units to be taken out of service, in pairs, and should be completed by the end of calendar year 2023. Reclamation is planning to perform maintenance on each of the four hollow jet valves in summer of 2023. 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 2023. If implemented, releases greater than powerplant capacity would be made consistent with the 1956 Colorado River Storage Project Act,[57] the CRBPA, the LTEMP ROD, and the Glen Canyon Dam Operating Criteria.

Releases from Lake Powell in water year 2023 will continue to reflect consideration of the uses and purposes identified in the authorizing legislation for Glen Canyon Dam. Monthly releases will also be consistent with the LTEMP ROD and applicable Secretarial decisions and are updated to be consistent with annual volumes determined pursuant to the 2007 Interim Guidelines.

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

Daily and hourly releases in 2023 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 2023, 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.

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

Lake Mead

For calendar year 2022, a Shortage Condition was the criterion governing the operation of Lake Mead in accordance with Article III(3)(c) of the Operating Criteria, Article II(B)(3) of the Consolidated Decree, Section 2.D.1 of the 2007 Interim Guidelines, applicable provisions of the LB DCP Agreement, and Sections III.B.1.a and III.B.2.a of Exhibit 1 to the LB DCP Agreement. Delivery of water to Mexico was scheduled in accordance with Article 15 of the 1944 United States-Mexico Treaty and Minutes No. 242, 323, and 327 of the IBWC.

Lake Mead began water year 2022 on October 1, 2021, at elevation 1,067.68 feet (325.43 meters), with 9.02 maf (11,130 mcm) in storage, which is 35 percent of the conservation capacity[58] of 26.12 maf (32,220 mcm). Lake Mead ended water year 2022 at elevation 1,045.03 feet (318.53 meters) with 7.33 maf (9,040 mcm) in storage (28 percent of capacity) on September 30, 2022.

The total release from Lake Mead through Hoover Dam during water year 2022 was 8.90 maf (10,980 mcm). The total release from Lake Mead through Hoover Dam during calendar year 2022 is projected to be 8.76 maf (10,810 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 2022, inflow into Lake Mead was 7.78 maf (9,600 mcm), consisting of 7.00 maf (8,630 mcm) of water released from Glen Canyon Dam and 0.776 maf (957 mcm) of inflows between Glen Canyon and Hoover Dams. For water year 2023, under the most probable inflow scenario, total inflow into Lake Mead is projected to be 7.81 maf (9,630 mcm).

Based on the August 2022 24-Month Study, Lake Mead's elevation on January 1, 2023, as adjusted to reflect operational neutrality as outlined in the Lake Powell operating decision in water year 2022, is projected to be 1,047.61 feet (319.31 meters). In accordance with Section 2.D.1 of the 2007 Interim Guidelines and the applicable provisions of the LB DCP Agreement, a Shortage Condition, consistent with Section 2.D.1.b of the 2007 Interim Guidelines, as well as 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 2023. Releases from Lake Mead through Hoover Dam may also be adjusted for the creation and/or delivery of ICS, consistent with Section 3 of the 2007 Interim Guidelines and Sections III and IV of Exhibit 1 to the LB DCP Agreement, in calendar year 2023.

Under the most probable inflow scenario, Lake Mead is projected to end water year 2023 at elevation 1,016.28 feet (309.76 meters), with 5.43 maf (6,700 mcm) in storage (21 percent of capacity). Following the end of the water year, Lake Mead is projected to rise to elevation 1,021.39 feet (311.32 meters) with 5.75 maf (7,090 mcm) in storage (22 percent of capacity) at

[58] Conservation capacity is the amount of space available for water storage between Lake Mead's water surface elevations 895.00 feet (272.80 meters) and 1,219.64 feet (371.75 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.

the end of calendar year 2023. The total release from Lake Mead through Hoover Dam during water year 2023 is projected to be 8.85 maf (10,920 mcm). The total release from Lake Mead through Hoover Dam during calendar year 2023 is projected to be 8.95 maf (11,040 mcm).

The Minimum Probable inflow scenario in the August 2021 24-Month Study activated the provision in Section V.B.2 of Exhibit 1 to the LB DCP Agreement requiring consultation between the Secretary and the Lower Division States regarding measures to avoid and protect against the potential for Lake Mead to decline below 1,020 feet (310.9 meters). These consultations resulted in the December 15, 2021 MOU to facilitate near-term actions to maintain the water surface elevation at Lake Mead. The 500 Plus Plan aims to generate an additional 0.500 maf (617 mcm) of voluntary conservation each year in 2022 and 2023, relative to the June 2021 24-Month Study modeling assumptions, in addition to the required shortage reductions and DCP contributions under the 2007 Interim Guidelines and Lower Basin DCP Agreement, respectively.

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.

Lake Mohave and Lake Havasu

Lake Mohave started water year 2022 at an elevation of 638.04 feet (194.47 meters) with 1.57 maf (1,940 mcm) in storage. The water level of Lake Mohave was regulated between elevation 634.42 feet (193.37 meters) and 643.97 feet (196.28 meters) during the water year, ending at an elevation of 639.17 feet (194.82 meters), with 1.60 maf (1,970 mcm) in storage. During water year 2022, 8.49 maf (10,470 mcm) was released from Davis Dam. The calendar year 2022 total release is projected to be 8.34 maf (10,290 mcm).

For water and calendar years 2023, Davis Dam is projected to release nearly the same amount of water as in 2022, less any reductions in deliveries and adjustments for the creation and/or delivery of ICS. The water level in Lake Mohave will be regulated between an elevation of approximately 633.00 feet (192.94 meters) and 645.00 feet (196.60 meters).

Lake Havasu started water year 2022 at an elevation of 448.49 feet (136.70 meters) with 0.590 maf (728 mcm) in storage. The water level of Lake Havasu was regulated between elevation 446.38 feet (136.06 meters) and 448.84 feet (136.81 meters) during the water year, ending at an elevation of 447.96 feet (136.54 meters), with 0.579 maf (714 mcm) in storage. During water year 2022, 6.23 maf (7,680 mcm) was released from Parker Dam. The calendar year 2022 total release is projected to be 6.21 maf (7,660 mcm).

For water and calendar years 2023, Parker Dam is expected to release nearly the same amount of water as in 2022, less any reductions in deliveries and adjustments for the creation and/or delivery of ICS. The water level in Lake Havasu will be regulated between an elevation of approximately 446.00 feet (135.94 meters) and 450.00 feet (137.16 meters).

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

Bill Williams River

Alamo Lake elevation and storage decreased during water year 2022. Alamo Lake started water year 2022 at elevation 1,113.40 feet (339.36 meters) with 0.100 maf (123 mcm) in storage and ended water year 2022 at elevation 1,110.24 feet (338.40 meters) with 0.091 maf (112.74 mcm) in storage. In water year 2022, average daily releases from Alamo Lake were about 25 cfs (0.71 cms). Water released from Alamo Lake totaled 0.018 maf (22 mcm) for water year 2022.

Senator Wash and Laguna Reservoirs

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

Since 1992, elevation restrictions have been in place on Senator Wash Reservoir due to potential piping and liquefaction of foundation and embankment materials at West Squaw Lake Dike and Senator Wash Dam. Senator Wash Reservoir is restricted to an elevation of 240.00 feet (73.15 meters) with 0.0090 maf (11 mcm) of storage, a loss of about 0.0050 maf (6.2 mcm) of storage from its original capacity. Senator Wash Reservoir must not exceed an elevation of 238.00 feet (72.54 meters) for more than 10 consecutive days. This reservoir restriction is expected to continue through 2023.

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; however, the project was put on hold until a dredging project at Imperial Dam is completed. The revised estimated completion date is after 2024. In total, the Laguna Basin Dredging project will dredge approximately 3.55 million cubic yards (2.7 mcm) of sediment, reestablishing 140 acres (0.57 square kilometers) of open water. As of October 2022, approximately 2.72 million cubic yards (2.1 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 United States Army Corps of Engineers (USACE) in May 2013 and was valid through May 2020. The project permit from the USACE may be extended after the completion of the Imperial Dam dredging project.

Imperial Dam

Imperial Dam is the last major diversion dam on the Colorado River in the United States. From the head works at Imperial Dam, water is diverted into the All-American Canal on the California side of the dam and into the Gila Gravity Main Canal on the Arizona side of the dam. These diversions provide water to the Gila Project, the Yuma Project, the Imperial Irrigation District (IID), the Coachella Valley Water District, and the City of Yuma, and through Siphon Drop and Pilot Knob to the Northerly International Boundary (NIB) for diversion at Morelos Dam by Mexico. Flows arriving at Imperial Dam for calendar year 2022 are projected to be 5.53 maf (6,820 mcm). The flows arriving at Imperial Dam for calendar year 2023 are projected to be 5.30 maf (6,540 mcm).

Reclamation started a dredging project above Imperial Dam in March 2021. The purpose of this project is to remove sediment deposited immediately upstream of Imperial Dam that threatens to constrict and/or prevent the operation of Imperial Dam facilities. Large amounts of sediment deposits are detrimental to Imperial Dam water operations. Excessive sediment build up in the reservoir limits reservoir storage capacity and can impede gate operations. Periodic removal of sediment is necessary to allow delivery of water to the Gila Gravity Main Canal and the All-American canal. This project has been extended to remove an additional 0.300 million cubic yards (0.230 mcm) and is scheduled to be completed in 2023. As of October 2022, approximately 0.739 million cubic yards (0.565 mcm) of material have been removed. The project permit was obtained from the USACE and is valid through 2025.

Gila River Flows

During water year 2022, there was below average snowfall in the Gila River Basin, including the Salt and Verde River watersheds. The Salt River Project did not release water from its system in excess of diversion requirements at Granite Reef Diversion Dam in water year 2022. No water reached or was released from Painted Rock Dam by the USACE in water year 2022.

Warren H. Brock Reservoir

The Warren H. Brock (Brock) Reservoir is located near the All-American Canal in Imperial County, California. The purpose of the 0.0080 maf (9.9 mcm) Brock Reservoir is to reduce non-storable 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. In 2021, Reclamation completed the Warren H. Brock Reservoir Conservation Summary Report which includes, among other matters, a summary of water conserved by Brock Reservoir from 2013 through 2019.[59] Water conserved

[59] Available online at: https://www.usbr.gov/lc/region/programs/strategies/agreements/BrockReport.pdf.

by Brock Reservoir in 2020 and 2021 may be found in the respective annual Colorado River Accounting and Water Use Report, Arizona, California, and Nevada.[60]

Yuma Desalting Plant

The Yuma Desalting Plant (YDP) was authorized in 1974 under the Colorado River Basin Salinity Control Act (Public Law 93-320)[61] 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, a wetland of open water, vegetation, and mudflats within a Biosphere Reserve in Mexico. In calendar year 2022, the amount of water discharged from the Wellton-Mohawk Division through the bypass canal is anticipated to be 0.114 maf (140 mcm) measured at gaging station 0+00 and 0.118 maf (146 mcm) measured at the gaging station near the Southerly International Boundary (SIB), at an approximate concentration of total dissolved solids of 2,456 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. The Southern Nevada Water Authority (SNWA) may propose to make unused Nevada basic apportionment available for storage by the Metropolitan Water District of Southern California (MWD)[62] and/or Arizona Water Banking Authority (AWBA)[63] in calendar years 2022 and 2023.

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[64] were executed concurrent with the issuance

[60] Available online at: https://www.usbr.gov/lc/region/g4000/wtracct.html.
[61] Available online at: https://www.usbr.gov/lc/region/pao/pdfiles/crbsalct.pdf.
[62] 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.
[63] 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.
[64] 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.

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[65] and establishment of a DCP ICS category. ICS credits may be created and delivered in calendar years 2022 and 2023 pursuant to Section 3 of the 2007 Interim Guidelines, Sections III and IV of Exhibit 1 to 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.[66]

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.

Extraordinary Conservation ICS. Entities with approved plans may create Extraordinary Conservation ICS in 2022 and/or 2023. Table 5 provides a summary of anticipated, submitted, or approved Extraordinary Conservation ICS plans of creation in 2022 and 2023. Entities with available Extraordinary Conservation ICS may request delivery of ICS credits in 2022 and 2023[67].

[65] Information on the agreements related to the creation of ICS under the LB DCP Agreement can be found at: https://www.usbr.gov/lc/region/programs/dcp.html.
[66] Available online at: https://www.usbr.gov/lc/region/g4000/wtracct.html.
[67] The ICS delivery volumes will be reflected in Reclamation's water accounting report. The water accounting report is available online at: https://www.usbr.gov/lc/region/g4000/wtracct.html.

Table 5. Summary of Extraordinary Conservation ICS Plans of Creation in Calendar Years 2022 and 2023

Entity	2022 Plan of Creation	Status of 2022 Plan	2023 Plan of Creation	Status of 2023 Plan
CAWCD	up to 0.100 maf (123 mcm)	approved	up to 0.100 maf (123 mcm)	submitted
Gila River Indian Community	up to 0.079 maf (97 mcm)	approved	--	--
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 2022 and 2023, the Central Arizona Water Conservation District (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 2022 and 2023, CAWCD, MWD, and SNWA may request delivery of YDP Pilot Run System Efficiency ICS credits.

Tributary Conservation ICS. SNWA has an approved plan to create up to 0.043 maf (53 mcm) of Tributary Conservation ICS in 2022 and has submitted a plan to create up to 0.044 maf (54 mcm) in 2023. 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 2022 and 2023. 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 2022 and 2023, 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 2022 and 2023 by entities making DCP contributions consistent with Section III of Exhibit 1 to the LB DCP Agreement. Following creation, DCP ICS may be delivered in a subsequent year in accordance with Section III.F of Exhibit 1 to the LB DCP Agreement.

System Conservation

System conservation agreements have allowed water users to participate in projects designed to determine whether voluntary, temporary, and compensated programs to conserve or reduce consumptive use of Colorado River water can benefit the entire Colorado River system by mitigating the effect on declining storage levels in Colorado River reservoirs.[68,69] Agreements previously executed under the PSCP in the Lower Basin continue to be implemented in 2022 and 2023.[70]

Consistent with the Secretary's efforts to create or conserve 0.100 maf (123 mcm) or more of Colorado River system water annually in the Lower Basin under the LB DCP Agreement and the additional conservation goals under the 500 Plus Plan MOU, Reclamation and the MOU parties have entered into agreements to create system conservation water consistent with these two agreements. A summary of agreements implemented in calendar years 2022 and 2023 are shown in Table 6.

[68] For the period from 2015 through 2018, the 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.

[69] Pursuant to Public Law 113-235, a report from the Secretary evaluating the effectiveness of the water conservation pilot projects was submitted to Congress, including a recommendation that the activities undertaken by the pilot projects should be continued. More information is available online at: https://www.usbr.gov/lc/region/programs/PilotSysConsProg/report_to_congressW_appendices2021.pdf.

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

Table 6. Summary of Projected System Conservation in the Lower Basin for Calendar Years 2022 and 2023

Entity/Project	2022 Volume	2023 Volume	Agreement or Program	Funder(s)	U.S. Funded 2022 Volume[71]	U.S. Funded 2023 Volume
242 Wellfield Expansion	0.013 maf (16 mcm)	0.017 maf (21 mcm)	LB DCP Agreement	Reclamation	0.013 maf (16 mcm)	0.017 maf (21 mcm)
Colorado River Indian Tribes	0.050 maf (62 mcm)	--	Arizona LB DCP Framework Agreement	--	--	--
Colorado River Indian Tribes	0.005 maf (6 mcm)	--	500 Plus Plan LB DCP Agreement	Reclamation	0.005maf (6 mcm)	--
Fort McDowell-Yavapai Nation	0.014 maf (17 mcm)	--	LB DCP Agreement	Reclamation	0.014 maf (17 mcm)	--
Gila River Indian Community	0.051 maf (63 mcm)	--	500 Plus Plan LB DCP Agreement	Reclamation	0.051 maf (63 mcm)	--
Central Arizona Project Contractors	0.0945 maf (117 mcm)	--	500 Plus Plan LB DCP Agreement	Reclamation, ADWR, CAWCD, and SNWA	0.064 maf (79 mcm)	--
Yuma Mesa Irrigation and Drainage District	0.009 maf (11 mcm)	0.014 maf (17 mcm)	500 Plus Plan LB DCP Agreement	Reclamation, ADWR, CAWCD, and SNWA	0.001 maf (1 mcm)	0.002 maf (2 mcm)
Mohave Valley Irrigation and Drainage District	0.0096 maf (12 mcm)	0.0096 maf (12 mcm)	500 Plus Plan LB DCP Agreement	Reclamation, ADWR, CAWCD, MWD, and SNWA	0.001 maf (1 mcm)	0.001 maf (1 mcm)
MWD-PVID Forbearance and Fallowing Program	0.051 maf (63 mcm)	0.058 maf (72 mcm)	500 Plus Plan LB DCP Agreement	Reclamation, CAWCD, MWD, and SNWA	0.025 maf (31 mcm)	0.029 maf (36 mcm)

[71] The U.S. funded portion of the agreement volume is counted towards the Secretary's efforts to create or conserve 0.100 maf (123 mcm) or more of Colorado River system water annually in the Lower Basin under the LB DCP Agreement.

Additional projects or agreements to create or conserve system water in the Lower Basin may also be implemented in calendar years 2022 and/or 2023.

Delivery of Water to Mexico

Delivery of water to Mexico pursuant to the 1944 United States-Mexico Water Treaty and IBWC Minute No. 323 is anticipated to be 1.45 maf (1,790 mcm) in calendar year 2022. This volume reflects a shortage reduction of 0.050 maf (62 mcm) pursuant to Section III.A of IBWC Minute No. 323, a water savings contribution of 0.030 maf (37 mcm) as required by Mexico under Section IV of IBWC Minute No. 323, the creation of approximately 0.002 maf (2.5 mcm) of water for Mexico's Water Reserve pursuant to Section V of IBWC Minute No. 323, and the delivery of approximately 0.035 maf (43 mcm) of water from Mexico's Water Reserve for environmental purposes[72] in accordance with IBWC Minute No. 323 Section V and accordingly with Section VIII and IX regarding the commitment of the United States' share of water for the environment. The water savings contribution volume shall be accounted for as described in the Joint Report of the Principal Engineers with the Implementing Details of the Binational Water Scarcity Contingency Plan in the Colorado River Basin (2019 Joint Engineers' Report).[73] 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.[74]

Of the scheduled delivery to Mexico in calendar year 2022, approximately 1.310 maf (1,620 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. 327 and the Emergency Delivery Agreement,[75] Mexico, through the IBWC, may request water to 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 2022, approximately 3,465 acre-feet (4.3 mcm) is scheduled to be delivered to Tijuana, Baja California.

Of the total delivery at SIB projected in calendar year 2022, approximately 0.081 maf (100 mcm) is projected to be delivered from the Yuma Project Main Drain and approximately 0.052 maf (64 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 0.014 maf (17 mcm) in calendar year 2022. 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

[72] More information is available in the 2021 Joint Engineers' Report online at: https://www.ibwc.gov/Files/Min323_joint_report_eng.pdf.
[73] Joint Report of the Principal Engineers with the Implementing Details of the Binational Water Scarcity Contingency Plan in the Colorado River Basin. Available online at: https://www.ibwc.gov/Files/joint_report_min323_bi_water_scarcity_contingency_plan_final.pdf.
[74] Available online at: https://www.usbr.gov/lc/region/g4000/wtracct.html.
[75] 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 February 8, 2022.

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 and Section III.A of IBWC Minute No. 323, a volume of 1.430 maf (1,760 mcm) will be available to be scheduled for delivery to Mexico in calendar year 2023. This volume may be further adjusted for water savings contributions as required under Section IV of IBWC Minute No. 323. Mexico may create water for or take delivery of water from Mexico's Water Reserve pursuant to Section III.C and 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 2023 will be delivered at NIB. Under IBWC Minute No. 327 and the Emergency Delivery Agreement, water may be delivered to Tijuana through MWD, the San Diego County Water Authority, and the Otay Water District's respective distribution system facilities in California.

Drainage flows to the Colorado River from the South Gila Drain Pump Outlet Channels and the Yuma Mesa Conduit are projected to be 0.003 maf (3 mcm) and 0.031 maf (38.6 mcm), respectively, for calendar year 2022. Consistent with Articles 11 and 15 of the 1944 United States-Mexico Water Treaty and IBWC Minute No. 242, this water is available for delivery at NIB in satisfaction of the 1944 United States-Mexico Water Treaty.

As stated in IBWC Minute No. 242, water delivered to Mexico upstream of Morelos Dam shall have an annual average salinity of no more than 115 ppm ± 30 ppm United States' count (121 ppm ± 30 ppm Mexican count) over the annual average salinity of Colorado River waters which arrive at Imperial Dam. This difference, known as the salinity differential, is projected to be 140 ppm by the United States' count for calendar year 2022.

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.

2023 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

- 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, 2022 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 2022 24-Month Study projection of the most probable near-term water supply conditions in the basin, (3) the concept of operational neutrality as outlined in the Lake Powell annual operating decision in water year 2022,[76] (4) the concept of preserving the benefits to Glen Canyon Dam facilities and operations in 2023 of the operating decisions made in water year 2022,[76] and (5) Section 6.D.1 of the 2007 Interim Guidelines, the Lower Elevation Balancing Tier will govern the operation of Lake Powell for water year 2023. Subject to decisions regarding preservation

[76] More information about Lake Powell's operating decision for water year 2022 is available online: https://www.usbr.gov/uc/DocLibrary/Plans/20220503-2022DROA-GlenCanyonDamOperationsDecisionLetter-508-DOI.pdf.

of the benefits to Glen Canyon Dam facilities and operations, the August 2022 24-Month Study of the most probable inflow scenario projects the water year 2023 release from Glen Canyon Dam to be 7.00 maf (8,630 mcm). Given the hydrologic variability of the Colorado River System and consistent with Section 6.D.1 of the 2007 Interim Guidelines, the projected water year release from Lake Powell in 2023 will range from 7.00 maf (8,630 mcm) to 9.50 maf (11,720 mcm). Because the 2022 operations were intended to protect critical elevations at Lake Powell, Reclamation will implement operations to protect these critical elevations and preserve the benefits of the 2022 operations in water year 2023. Specifically, Reclamation modeled Lower Elevation Operating Tier operations in WY 2023 as follows in the August 24-Month Study:

- The Glen Canyon Dam annual release has initially been set to 7.00 maf (8,630 mcm), and in April 2023 Reclamation will evaluate hydrologic conditions to determine if balancing releases may be appropriate under the conditions established in the 2007 Interim Guidelines
- Balancing releases will be limited (with a minimum of 7.00 maf (8,630 mcm)) to protect Lake Powell from declining below elevation 3,525 feet (1,074.42 meters) at the end of December 2023
- Balancing releases will account for operational neutrality of the 0.480 maf (592 mcm) that was retained in Lake Powell under the May 2022 action. Any Lake Powell balancing release volume will be calculated as if the 0.480 (592 mcm) maf had been delivered to Lake Mead in WY 2022
- The modeling approach for WY 2023 will apply to 2024 for purposes of the August 24-Month Study

In accordance with the May 3rd Letter, and consistent with the provisions of the 2007 Interim Guidelines, and to preserve the benefits to Glen Canyon Dam facilities from 2022 Operations into 2023 and 2024, Reclamation will continue to consult with the Basin States on monthly and annual operations. Reclamation will also consult with Basin Tribes, the Republic of Mexico, other federal agencies, water users and non-governmental organizations with respect to implementation of these monthly and annual operations.

Reclamation will continue to carefully monitor hydrologic and operational conditions and assess the need for additional responsive actions and changes to operations. Reclamation will continue to consult with the Basin States, Basin Tribes, the Republic of Mexico, and other partners on Colorado River operations to consider and determine whether additional measures should be taken to further enhance the preservation of these benefits, as well as recovery protocols, including those of future protective measures for both Lake Powell and Lake Mead.

Lower Basin

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

(a) 1944 United States-Mexico Water Treaty obligations;
(b) Reasonable beneficial consumptive use requirements of mainstream users in the Lower Division States;

(c) Net river losses;
(d) Net reservoir losses;
(e) Regulatory wastes; and
(f) Flood control.

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

The 2007 Interim Guidelines are being utilized in calendar year 2023 and serve to implement the narrative provisions of Article III(3)(a), Article III(3)(b), and Article III(3)(c) of the Operating Criteria and Article II(B)(1), Article II(B)(2), and Article II(B)(3) of the Consolidated Decree for the period through 2026. The 2007 Interim Guidelines will be used annually by the Secretary to determine the quantity of water available for use within the Lower Division States.

Consistent with the 2007 Interim Guidelines and the LB DCP Agreement, and taking into consideration the concept of operational neutrality as outlined in the Lake Powell operating decision in water year 2022, the August 2022 24-Month Study was used to forecast the system storage as of January 1, 2023. Based on a projected January 1, 2023 Lake Mead elevation, as adjusted to reflect operational neutrality as outlined in the Lake Powell operating decision in water year 2022, of 1,047.61 feet (319.31 meters) and consistent with Section 2.D.1 of the 2007 Interim Guidelines, a Shortage Condition, consistent with Section 2.D.1.b, will govern releases for use in the states of Arizona, Nevada, and California during calendar year 2023 in accordance with Article III(3)(c) of the Operating Criteria and Article II(B)(3) 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 2023. Water deliveries in the Lower Basin during calendar year 2023 will be limited to 7.083 maf (8,730 mcm) and will be further adjusted for DCP contributions and creation and/or delivery of ICS credits and/or DSS.

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 2023 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 2023 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, the December 15, 2021 MOU to maintain the elevation of Lake Mead, and as specified in Section 4.b of the LB DCP Agreement.

In calendar year 2023, 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 2023.

The IOPP, which became effective January 1, 2004, will be in effect during calendar year 2023. In accordance with Section 2.6.e of the IOPP, further accumulation of inadvertent overruns in calendar year 2023 will be suspended. Payback balances by state and user may be found in the annual Colorado River Accounting and Water Use Report, Arizona, California, and Nevada.[77]

In calendar year 2023, 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. In calendar year 2023, ICS credits will be created and delivered pursuant to Section 3 of the 2007 Interim Guidelines, Sections III and IV of Exhibit 1 to the LB DCP Agreement, and appropriate forbearance and delivery agreements.

Consistent with Section 4 of the 2007 Interim Guidelines, DSS may be created and delivered in calendar year 2023.

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

[77] 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.

A volume of 1.430 maf (1,760 mcm) of water will be available to be scheduled for delivery to Mexico during calendar year 2023 subject to and in accordance with Article 15 of the 1944 United States-Mexico Water Treaty, IBWC Minutes No. 242 and 327, and Section III.A of IBWC Minute No. 323. This volume may be further adjusted for water savings contributions as required under Section IV of IBWC Minute No. 323, as detailed in the 2019 Joint Engineers' Report. In accordance with Section III.C and Section V of IBWC Minute No. 323, Mexico may create water for or take delivery of water from Mexico's Water Reserve.

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

DISCLAIMER

Nothing in this AOP is intended to interpret the provisions of the Colorado River Compact (45 Stat. 1057); the Upper Colorado River Basin Compact (63 Stat. 31); the Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande, Treaty Between the United States of America and Mexico (Treaty Series 994, 59 Stat. 1219); the United States/Mexico agreements in Minute No. 242 of August 30, 1973 (Treaty Series 7708; 24 UST 1968), Minute No. 323 of September 21, 2017, or Minute No. 327 of January 28, 2022; 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

500 Plus Plan	Memorandum of Understanding (MOU) to maintain the elevation in Lake Mead, signed December 15, 2021
1944 United States-Mexico Water Treaty	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
AMWG	Glen Canyon Dam Adaptive Management Work Group
AOP	Annual Operating Plan
AWBA	Arizona Water Banking Authority
Brock	Warren H. Brock Reservoir
CAWCD	Central Arizona Water Conservation District
CBRFC	National Weather Service's Colorado Basin River Forecast Center
CFR	Code of Federal Regulations
cfs	cubic feet per second
cms	cubic meters per second
Consolidated Decree	Consolidated Decree of the Supreme Court of the United States in *Arizona v. California*, 547 U.S. 150
CPM	Colorado pikeminnow
CRBPA	Colorado River Basin Project Act of 1968
DCP	Drought Contingency Plan
DROA	Drought Response Operations Agreement
DSS	Developed Shortage Supply
FG-Ops	Flaming Gorge Operation Plan
IBWC	International Boundary and Water Commission
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
MOU	Memorandum of Understanding
MWD	The Metropolitan Water District of Southern California
NIB	Northerly International Boundary
Operating Criteria	Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs Pursuant to the Colorado River Basin Project Act of September 30, 1968
ppm	parts per million
PSCP	Pilot System Conservation Program
Reclamation	Bureau of Reclamation
ROD	Record of Decision
SCPP	System Conservation Pilot Program
Secretary	Secretary of the U.S. Department of the Interior

SEIS	Supplemental Environmental Impact Statement
SIB	Southerly International Boundary
SIRA	Storage and Interstate Release Agreement
SJRIP	San Juan River Basin Recovery Implementation Program
SMB	Smallmouth bass
SNWA	Southern Nevada Water Authority
UCRC	Upper Colorado River Commission
UCRIP	Upper Colorado River Endangered Fish Recovery Program
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WAPA	Western Area Power Administration
WY	Water Year
YDP	Yuma Desalting Plant