Chapter 2. Description of Alternatives

2.1 Development of Alternatives

The goal of the alternatives development phase for this Draft EIS was to develop a reasonable and broad range of alternatives for managing the Colorado River system and its resources post-2026. The objectives associated with analyzing a sufficiently broad range of alternatives are two-fold:

1. Ensuring that decision-makers and the public are informed of all potential impacts and tradeoffs of different operational approaches
2. Providing analysis for the components that may eventually make up the Preferred Alternative in the Final EIS

The process of developing the range of alternatives was informed by solicitation of input and extensive collaborative engagement with stakeholders throughout the Basin. As described in **Section 1.5**, Scope of the EIS, Reclamation solicited input on considerations for alternatives during pre-scoping and scoping periods in 2022 and 2023 and worked collaboratively with Basin stakeholders to identify a range of alternatives throughout 2024 and 2025. To facilitate public understanding and input on the alternatives, since December 2023, Reclamation has developed and hosted the Post-2026 Operations Exploration Web Tool, an online platform that allows stakeholders, interested parties and the public to independently or collaboratively design, model and explore a wide range of creative operational strategies. Use of the platform is not considered formal input to the Post-2026 Process, but insights from the 500-plus operational strategies entered into the platform were used to inform alternatives.

During the public involvement periods and the subsequent alternatives development process, Reclamation received considerable input from the Basin States,[1] many Basin Tribes,[2] conservation organizations, other federal agencies, other stakeholders, and members of the public. Input submitted ranged from detailed proposed alternatives to operational concepts and principles. Throughout the alternatives development phase, Reclamation conducted over 100 meetings with states, tribes, and other partners to review and discuss their input. For those proposals containing sufficient detail to be considered as a full alternative or a major component of an alternative, Reclamation worked extensively with these entities to not only understand and gather additional

[1] Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming

[2] There are 30 federally recognized Native American Tribes in the Basin: Ak-Chin Indian Community, Chemehuevi Indian Tribe, Cocopah Indian Tribe, Colorado River Indian Tribes, Fort McDowell Yavapai Nation, Fort Mojave Indian Tribe, Fort Yuma-Quechan Tribe, Gila River Indian Community, Havasupai Tribe, Hopi Tribe, Hualapai Tribe, Jicarilla Apache Nation, Kaibab Band of Paiute Indians, Las Vegas Paiute Tribe, Moapa Band of Paiute Indians, Navajo Nation, Pascua Yaqui Tribe, Pueblo of Zuni, Salt River Pima-Maricopa Indian Community, San Carlos Apache Tribe, San Juan Southern Paiute, Shivwits Band of Paiutes, Southern Ute Indian Tribe, Tohono O'odham Nation, Tonto Apache Tribe, Ute Indian Tribe of the Uintah and Ouray Reservation, Ute Mountain Ute Tribe, White Mountain Apache Tribe, Yavapai-Apache Nation, and Yavapai-Prescott Indian Tribe.

information, but also to model and perform preliminary analyses of their proposals to facilitate refinements. Reclamation continued to inform the public on the status of alternatives development by conducting a public webinar in October 2024[3] and publishing an Alternatives Report (Reclamation 2025a) documenting the preliminary alternatives as of January 2025.

This Draft EIS includes five alternatives (No Action and four action alternatives) that capture an appropriate range of operational concepts and potential environmental impacts. Three of the alternatives are adapted from those described in the Alternatives Report published in January 2025, and their former names are provided in parentheses. The Basin Hybrid Alternative from the Alternatives Report was replaced with the Supply Driven Alternative. Three of the alternatives directly reflect proposals and concepts received from, and refined through, stakeholder engagement. Specifically, a group of Basin Tribes and other federal agencies informed Reclamation's development of the Enhanced Coordination Alternative, and the Maximum Operational Flexibility Alternative is based on a proposal from a consortium of conservation organizations. The Supply Driven Alternative incorporates concepts from the separate proposals submitted by the Upper Division and Lower Division States, as well as ideas emerging from discussions with the Basin States during spring 2025. Reclamation developed the Basic Coordination Alternative to provide a compliance option for a specific set of operations that could be implemented in 2027 if no new agreements among Basin water users are adopted.

The five alternatives are:

- No Action Alternative
- Basic Coordination Alternative (Federal Authorities Alternative)
- Enhanced Coordination Alternative (Federal Authorities Hybrid Alternative)
- Maximum Operational Flexibility Alternative (Cooperative Conservation Alternative)
- Supply Driven Alternative

Reclamation is not carrying forward the separate proposals submitted by the Upper Division States (as revised in December 2024), the Lower Division States (as revised in January 2025) or the Gila River Indian Community in their entirety as full alternatives for analysis in the Draft EIS. Upon receiving the revised Upper Division and Lower Division States proposals, Reclamation performed preliminary modeling and concluded that the revisions did not sufficiently address the lack of an appropriate basis for the comprehensive and coordinated operations of Lake Powell and Lake Mead that, based on preliminary modeling results, was found lacking in the original proposals. However, Reclamation has crafted action alternatives – the Enhanced Coordination Alternative and the Supply Driven Alternative – that include a number of key elements of these submissions.

Reclamation worked closely with the Gila River Indian Community to fully understand the objectives, perspectives, and goals associated with their original proposal and proposed refinements to the preliminary range of alternatives described in the Alternatives Report. Reclamation has

[3] Webinar presentation material is available here: https://www.usbr.gov/ColoradoRiverBasin/documents/post2026/P26_Public_Status_Update_Webinar_10-10-24_508.pdf.

integrated the majority of the concepts embodied in the Community's submission within the range of alternatives, primarily the Enhanced Coordination Alternative, which is fully analyzed in this Draft EIS.

The alternatives analyzed in this Draft EIS include a broad range of operational elements incorporating over three years of input provided by stakeholders and the public and received through consultations with the Basin States and tribes. During this timeframe, Reclamation and the Department have engaged extensively with the Basin States to facilitate an agreement among the seven Basin States and the Secretary on various aspects of post-2026 operations for consideration in this NEPA process. Despite this extensive engagement, a consensus-based approach to Basin reservoir operations has not yet been achieved and therefore, Reclamation has not identified a Preferred Alternative in this Draft EIS. Since 1970, the Basin States have supported operations and reached agreements among themselves and with the Secretary on various aspects of Colorado River reservoir operations. Achieving a consensus-based approach to Basin reservoir operations has proved critical to the long-term operating success of the Basin. Given the importance of a consensus-based approach to operations in terms of the stability of the system, the Department will continue to pursue an agreement among various Basin entities. Should a consensus emerge following the publication of this Draft EIS, Reclamation anticipates that such an agreement will incorporate elements or variations of these Draft EIS alternatives and will be fully analyzed in the Final EIS. A description of each of the operational elements that comprise alternatives follows.[4]

2.2 Operational Elements

In consideration of the input received and to meet the purpose and need described in **Section 1.3**, Reclamation identified four operational elements that make up each alternative described below. Each alternative represents a different option for implementing the proposed federal action described in **Section 1.2**. Descriptions of the alternatives will be based on their implementation of each element. For a summary of key features of each alternative, see **Section 2.10**, Summary Comparison of Alternatives. **Appendix A**, Colorado River Simulation System (CRSS) Model Documentation, describes detailed modeling assumptions for the alternatives.

Determination of deliveries to Mexico is not a part of the proposed federal action. Any such determination would be made in accordance with the 1944 Water Treaty. Nevertheless, modeling assumptions regarding water deliveries to Mexico are necessary in order to analyze the potential impacts to hydrologic and other environmental resources. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

[4] The operational elements include modeling assumptions but do not necessarily describe all implementation details that would be developed should an alternative be finalized and adopted. Impacts are addressed in subsequent chapters.

2.2.1 Guidelines to Reduce or Increase Deliveries from Lake Mead

This element addresses the adoption of guidelines that would identify those circumstances under which the Secretary would reduce the annual amount of water available for consumptive use from Lake Mead to the Lower Division states below 7.5 maf, pursuant to the Consolidated Decree (*Arizona v. California*, 547 U.S. 150). It also addresses the definition of conditions under which the Secretary may declare the availability of surplus water for use within the Lower Division states. Article III of the LROC lists some relevant factors for determining available water, including storage in Lake Mead, expected inflows, and historical streamflow.

The primary purpose of this element is the distribution of water supplies during drought and low-reservoir conditions. While Lake Powell and Lake Mead have large storage capacities, recent years have shown that careful management of available supply is key to ensure sufficient supplies are available to meet water demands. The alternatives present a range of shortage guidelines, from aggressive shortages to reductions slightly higher than the maximum volumes included in current policies, different distributions in the Lower Division states, and a variety of criteria to trigger reductions.

The specified shortage volumes in each alternative include modeling assumptions related to reductions in water deliveries to Mexico in order to analyze the potential impacts to hydrologic and other environmental resources. These modeling assumptions are identical under all alternatives.[5] **Appendix K**, Sensitivity Analysis – Effects of Modeling Assumptions with Regard to Future Water Deliveries to Mexico, compares the effects of varied assumptions.

This element also provides for the distribution of water above 7.5 maf when reservoir conditions support it.

2.2.2 Coordinated Reservoir Operations (Lake Powell and Lake Mead)

This element addresses adoption of guidelines for the coordinated operation of Lake Powell and Lake Mead to potentially improve operation of these two reservoirs. The LROC specify coordination at high elevations through the equalization of storage in Lake Powell and Lake Mead, as nearly as practicable.

Operations under the current guidelines have provided valuable experience related to the implications of coordinating Lake Powell and Lake Mead. The effects of coordination on each reservoir depend on other aspects of an alternative, for example, shortage triggers and volumes, so the degree to which coordination improves operations is context specific. The alternatives presented range from highly coordinated distribution of storage to minimal coordination.

2.2.3 Storage and Delivery of Conserved System and Non-System Water

This element addresses the adoption of guidelines for the storage and delivery of conserved Colorado River system and non-system water in Lake Mead and Lake Powell, pursuant to applicable

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

federal law, to increase flexibility in meeting water use needs while maintaining reservoir storage above critical elevations.

Extended drought, low reservoirs, and hydrologic variability from year to year create challenges when trying to plan for water supply and protect critical elevations. Mechanisms that offer water users flexibility to conserve and/or augment water supplies can increase stability of the reservoirs, thereby reducing the need for and mitigating the impacts of large shortages. The alternatives represent a wide range of approaches to this element, including no new conservation mechanism, to moderately sized pools in Lake Powell and Lake Mead open to users within the Upper and Lower basins, respectively, to large, inclusive pools that may be flexibly stored in either reservoir to maximize their benefit to the system.

While delivery of some existing stored water remains available after 2026 pursuant to existing agreements, Reclamation will establish guidelines for administration of a new storage mechanism as part of this public NEPA process. The guidelines will set forth Reclamation requirements for verification of the conservation action and water accounting procedures.

2.2.4 Additional Activities Above Lake Powell

This element addresses additional activities above Lake Powell including the use of the CRSP Upper Initial Units[6] and conservation by Upper Basin water users to support critical elevations at Lake Powell and other important system goals.

Since the adoption of the DCP, the Basin has recognized the importance of developing a framework to formally employ resources above Lake Powell to mitigate the potential for critical impacts to infrastructure. These alternatives represent various levels of within-ROD releases from CRSP Upper Initial Units (see **Section 1.9.4** and **Map 1-1**) and Upper Basin conservation, and different assumptions about consideration of these activities in broader operations.

2.3 Authorities to Implement Alternatives

The Secretary has the vested authority and responsibility to operate the System through coordinated operations, including the ability to respond to exigent and emergency conditions, pursuant to applicable federal law, the Decree, contractual obligations, and other elements of the Law of the River. The full extent of Reclamation's operational authority has not been tested to date—either operationally or through legislative or judicial review. The primary reason for this is that management of the river has been based on agreements among Basin water users. In most cases, Reclamation's authority to fully implement the agreements has not been in question; however, specific operational mechanisms negotiated as part of the 2019 DCP required congressional legislation[7] to fully implement.

[6] Flaming Gorge, Blue Mesa (the most upstream facility of the Aspinall Unit, which serves as its primary storage reservoir), and Navajo reservoirs.
[7] The Colorado River Drought Contingency Authorization Act was passed on April 16, 2019, directing the Secretary to implement the 2019 DCP.

The alternatives in this Draft EIS are designed to cover a wide range of potential outcomes with respect to post-2026 operations; accordingly, they incorporate components that are within existing authorities along with components that would require new authorities and/or new agreements among Basin water users to fully implement.

2.4 No Action Alternative

Under NEPA, an action agency is required to describe and analyze a "no action" alternative in an EIS. The design of a no action alternative is highly dependent on whether the proposed action would be a wholly new activity or would be a part of ongoing or continuing actions. The proposed action for this Post-2026 process represents ongoing activities because Reclamation has been and must continue to operate the system.

In developing the No Action Alternative, Reclamation carefully reviewed the No Action Alternative including the 2007 Interim Guidelines Final EIS (2007 Final EIS). Consistent with that No Action Alternative, with refinements, Reclamation based the No Action Alternative in this Draft EIS on the operating guidance that was in place before the adoption of the 2007 Interim Guidelines ROD (2007 ROD) to provide a reasonable representation of how the system would continue to operate if no additional operating guidelines were adopted.

Before the 2007 Interim Guidelines were in place, the basis for operations was the LROC, under which the Secretary made a number of determinations at the beginning of each operating year through the development and execution of the AOP, including the water supply available to users in the Lower Basin and the annual release from Lake Powell. The LROC does not include specific guidelines for such determinations, so the outcome of the annual determination in any particular year in the future could not be precisely known. However, a reasonable representation of future conditions under the No Action Alternative is needed for comparison to each action alternative. The modeling assumptions used for this representation are consistent with assumptions used in previous environmental compliance documents, most recently the 2007 Interim Guidelines, with appropriate refinements. The assumptions used in the No Action Alternative are not intended to limit or predetermine the decision in any future AOP determination.

Under this alternative, following the expiration of current domestic and international implementing agreements in 2026, Reclamation operations are assumed to immediately revert to the assumptions embedded in the No Action Alternative beginning October 1, 2026. This approach would represent a change from current operations (which are most closely captured in the Continued Current Strategies (CCS) comparative baseline - see **Section 3.2.3**) but would not represent a decision by Reclamation to adopt a new set of long-term operating guidelines.

2.4.1 Guidelines to Reduce or Increase Deliveries from Lake Mead

2.4.1.1. Shortage Conditions

In accordance with the Consolidated Decree and the LROC, the Secretary makes a determination each year as to whether the consumptive use requirements of mainstream users in the Lower Division states will be met under a Normal, Surplus, or Shortage Condition. The LROC specify that

the Secretary will consider all relevant factors in making a shortage determination and list some of the factors to be considered. However, there is no specific guidance as to exactly when, how, or to whom reductions in deliveries would be made. Therefore, it is impossible to know exactly how the Secretary might make a shortage determination from year to year in the future.

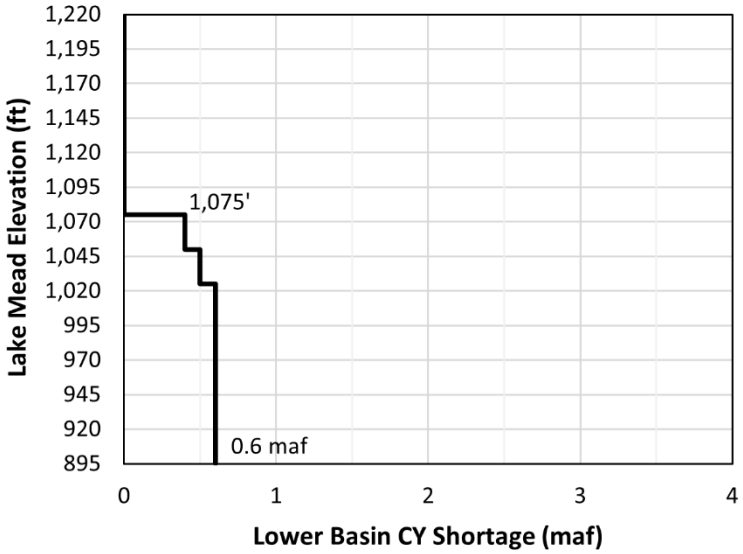
The Consolidated Decree, the CRBPA, water delivery contracts, and applicable provisions of the Law of the River provide some guidance with regard to how shortages would be allocated in the Lower Basin (e.g., PPR[8] deliveries must be met without regard to state lines, California does not incur shortages until Arizona post-1968 contracts are reduced completely), but there are no specific guidelines in place to further inform the Secretary's decision with respect to how shortages or surplus might be shared by Arizona, California and Nevada, and water users in those states.

Considering the experience gained implementing shortages according to the 2007 Interim Guidelines, the elevations and volumes adopted in that ROD are assumed for this alternative. Operational zones are summarized below and shown in **Figure 2-1**. The distribution of the shortages, summarized in **Table 2-1**, would be based on the interpretation of priority from the Consolidated Decree and CRBPA;[9] not the distribution adopted in expiring guidelines. The shortage volume would be determined for the upcoming CY based on January 1 Lake Mead elevation.

- When Lake Mead is projected to be below elevation 1,075 feet msl[10] and at or above elevation 1,050 feet on January 1, a shortage of 400 kaf would be imposed for that year.
- When Lake Mead is projected to be below elevation 1,050 feet and at or above elevation 1,025 feet on January 1, a shortage of 500 kaf would be imposed for that year.
- When Lake Mead is projected to be below elevation 1,025 feet on January 1, a shortage of 600 kaf would be imposed for that year.

[8] Certain Lower Basin Colorado River water rights are "present perfected rights" or "PPRs," which the Consolidated Decree quantified and defined as existing on June 25, 1929 (the effective date of the BCPA). PPRs are the highest priority Colorado River water rights.
[9] **Appendix C**, Shortage Allocation Model and Alternative Distribution Model Documentation, describes assumptions associated with the Priority Shortage Allocation Model (SAM), which represents an interpretation of the lower Colorado River priority systems among and within the Lower Division states absent additional agreements.
[10] Reservoir elevations are described in height above msl.

Figure 2-1
Shortage* Guidelines to Reduce Deliveries from Lake Mead, No Action Alternative



Note: Shortage volumes include modeling assumptions for reductions in water deliveries to Mexico. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

Table 2-1
Shortage Distribution*, No Action Alternative

Entity	Percentage of Total Shortages
Arizona	77.4
California	0
Nevada	5.93
Mexico	16.67
Total	**100**

Note: Shortage distributions include modeling assumptions for reductions in water deliveries to Mexico. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

2.4.1.2. Surplus Conditions

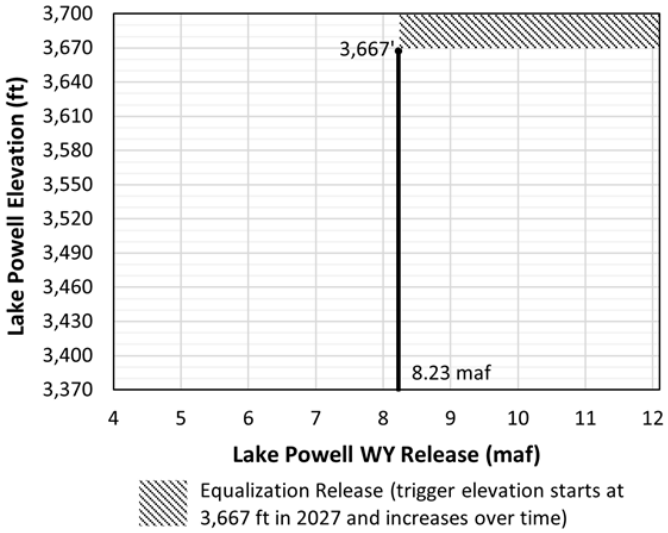
Volumes above normal apportionment would be distributed only when criteria are met in Lake Mead for a 70R Surplus Condition[11] or a Flood Control Surplus Condition.[12]

2.4.2 Coordinated Reservoir Operations (Lake Powell and Lake Mead)

The WY release volume from Lake Powell would be calculated based on the October 1 elevations of Lake Powell and Lake Mead using the curve depicted in **Figure 2-2**. The curve is used to determine Lake Powell's releases in accordance with the LROC. Pursuant to the LROC, the objective is to maintain a minimum release of water from Lake Powell of 8.23 maf unless a higher release is required for equalization.

Article II(2) of the LROC states the "objective shall be to maintain a minimum release of water from Lake Powell of 8.23 [maf]." Reclamation recognizes that entities in the Basin have different legal positions regarding how this LROC statement incorporates other Law of the River elements to determine annual releases. Reclamation also recognizes that variation in releases of water above and below the minimum objective release of 8.23 maf can, in appropriate circumstances, be adopted.

Figure 2-2
Coordinated Operations of Lake Powell and Lake Mead, No Action Alternative



[11] The 70R Strategy is a modeling approach used by Reclamation since the 1980s to understand the need to distribute additional water, and it was documented in the 2007 Final EIS. Under the strategy, a surplus condition is based on the system space requirement at the beginning of each year. Based on the 70th percentile historical runoff, a normal 7.5 maf delivery to the Lower Division States, the Upper Basin scheduled use, and Lake Powell and Lake Mead volumes at the beginning of the year, the volume of water in excess of the system space requirement at the end of the year is estimated. If that volume is greater than zero, a Surplus is declared.

[12] If flood control releases are anticipated to be required given the current inflow forecast, the Secretary declares Flood Control Surplus conditions for that year.

2.4.2.1. Primary Operations

If the October 1 elevation at Lake Powell is below the elevation specified by the equalization line for that year and spill avoidance releases are not required, a release of 8.23 maf would be made.

2.4.2.2. Coordination at High Elevations

A determination to potentially adjust releases from 8.23 maf for the purpose of equalizing storage in Lake Powell and Lake Mead would be made based on Lake Powell elevation using an extrapolation of the line adopted in the 2007 Interim Guidelines and documented in the 2007 Final EIS. This series of increasing Lake Powell elevations was developed as a translation of "602(a) Storage."[13] In 2027, equalization would be triggered at 3,667 feet; it would reach 3,698 feet in 2060 (the final year of the analysis period). A table showing specific years and elevations is included in **Appendix A**, CRSS Model Documentation. **Appendix J**, Sensitivity Analysis – Effects of Assumed Parameter Values on 602(a) Storage, describes the 602(a) storage calculation that forms the basis for the equalization line from the 2007 Interim Guidelines. It documents the parameters used in the 2007 calculation, which are also used in this extension through 2060. **Appendix J** also presents a comparison illustrating how different parameter assumptions would influence the resulting 602(a) storage values. If Lake Powell is above the equalization elevation in any month, WY releases would be adjusted above 8.23 maf if needed to bring Lake Powell elevation down to the equalization line based on the 2007 Interim Guidelines[14] or to equalize storage between Lake Powell and Lake Mead to the extent practicable, whichever is reached first.

2.4.2.3. Infrastructure Protection and Other Considerations

While assumptions for adjustments to Lake Powell releases to forestall reaching physical elevation 3,490 feet have not been developed for this alternative, Reclamation maintains the authority to modify operations to protect Glen Canyon Dam infrastructure.

2.4.3 Storage and Delivery of Conserved System and Non-System Water

2.4.3.1. Lake Powell and Lake Mead Mechanisms

There would be no new mechanisms to proactively conserve and store water in Lake Powell or Lake Mead.

2.4.3.2. Treatment of Pre-2027 Intentionally Created Surplus

ICS created under the 2007 Interim Guidelines and 2019 DCP that remains in Lake Mead in 2027 would be delivered in accordance with existing agreements. Modeling assumptions for the timing of these deliveries can be found in **Appendix B**, Modeling Assumptions: Lake Powell and Lake Mead Storage and Delivery of Conserved Water.

[13] CRBPA, section 602(a); LROC, section II(1). The 602(a) storage requirement specifies the amount of storage in Upper Basin reservoirs necessary to assure deliveries to the Lower Basin in compliance with the Compact without impairment to the annual consumptive use in the Upper Basin.

[14] For modeling purposes in this alternative, Reclamation intends that the equalization line concept used in the 2007 Interim Guidelines be applied and extended in the same manner as adopted in the 2007 Interim Guidelines with reference to 602(a) considerations.

2.4.4 Additional Activities Above Lake Powell

2.4.4.1. Upper Basin Conservation

No Upper Basin conservation would be included.

2.4.4.2. Releases to Protect Glen Canyon Dam

While specific assumptions for releases from CRSP Upper Initial Units have not been developed for this alternative, Reclamation maintains the authority to operate these reservoirs to protect Glen Canyon Dam infrastructure.

2.5 Basic Coordination Alternative

The Basic Coordination Alternative is designed to be implementable without agreements among Basin water users regarding distributions of lower Colorado River mainstream shortages, storage and delivery of conserved water from system reservoirs, or other voluntary agreements.

Management of the Colorado River has to date been informed by negotiated stakeholder agreements. In the absence of such agreements, efficient and sustainable management of the reservoirs and system resources under an increasingly broad range of potential future hydrologic conditions would be more challenging than under historical operations and would result in a number of highly undesirable consequences for many users.

With or without new agreements, the Secretary has the vested authority and responsibility to operate the System through coordinated operations, including the ability to respond to exigent and emergency conditions, pursuant to applicable federal law, the Decree, contractual obligations, and other elements of the Law of the River. The full extent of Reclamation's operational authority has not been tested to date—either operationally or through legislative or judicial review. Accordingly, Reclamation's description of how this alternative would be implemented relies on legal, operational, and engineering judgment regarding future operations under a broad range of hydrologic conditions.

While Reclamation has experience under high-flow conditions, including flood control operations, at Lake Powell and Lake Mead, Reclamation has not had to operate these reservoirs with extreme low-flow conditions imminently threatening critical infrastructure, which makes it difficult to predict operational outcomes. Reclamation would need to balance the needs of water users with infrastructure concerns in real time under such conditions.

It is important to note that this alternative is not Reclamation's proposal for a potential consensus alternative or stakeholder agreement; instead, the intention is to provide an environmental compliance option for a set of operations as a NEPA alternative that Reclamation could implement beginning in WY 2027 (that is, beginning October 1, 2026) if no consensus among relevant entities in the Basin is developed.

Reclamation acknowledges that the operations under this alternative may not provide adequate protection of critical infrastructure or the system and may be viable only in the short term given current reservoir conditions. If this alternative were selected in the ROD, Reclamation would

identify the conditions under which further action would be required, including adjustment of operations and prompt action to seek additional authorities, if needed.

2.5.1 Guidelines to Reduce or Increase Deliveries from Lake Mead

2.5.1.1. Shortage Conditions

This alternative includes shortages of up to 1.48 maf, distributed based on priority (see **Table 2-2**). The maximum shortage volume is set at a level estimated by Reclamation to ensure that an assumed minimum flow is available for infrastructure protection and delivery for municipal use by CAP users and other Fourth Priority mainstem entitlement holders in Arizona when mainstream shortage is distributed by priority.

Table 2-2
Shortage Distribution,
Basic Coordination Alternative

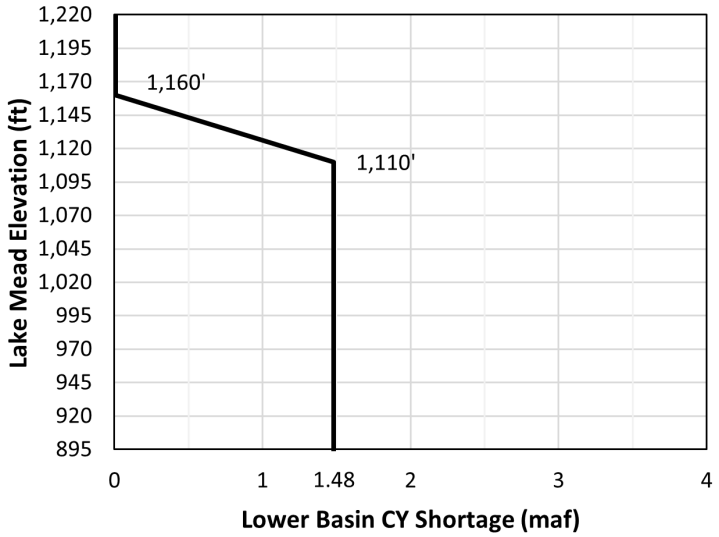
Entity	Percentage of Total Shortages
Arizona	77.40
California	0
Nevada	5.93
Mexico	16.67
Total	**100**

Note: Shortage distributions include modeling assumptions for reductions in water deliveries to Mexico. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

The shortage volume would be determined for the upcoming CY based on October 1[15] Lake Mead elevation. The shortage volumes are expressed as total Lower Basin shortage and include an assumption that the deliveries to Mexico are also reduced. The shortage guidelines are summarized below and shown in **Figure 2-3**.

- When Lake Mead is at or below elevation 1,160 feet and at or above 1,110 feet, a shortage volume would be imposed for that year based on a function of elevation, with 0.0 maf of shortage at 1,160 feet increasing linearly to 1.48 maf at 1,110 feet.
- When Lake Mead is below elevation 1,110 feet, a shortage of 1.48 maf would be imposed for that year.
- When Lake Mead is approaching 1,000 feet, the Secretary will determine and implement additional measures as necessary to protect critically low elevations, consistent with the Law of the River.[16]

Figure 2-3
Shortage Guidelines to Reduce Deliveries from Lake Mead, Basic Coordination Alternative



Note: Shortage volumes include modeling assumptions for reductions in water deliveries to Mexico. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

[15] For modeling purposes, assumptions regarding the use of projected or actual Lake Mead elevations to set operational conditions have been made. These assumptions are for modeling purposes only and precise implementation details will be developed in a ROD.

[16] This alternative proposes that the Secretary may seek new authorities to implement additional measures to protect critically low elevations at Lake Mead including additional shortages to Lower Basin water users. The possible outcomes of such a process are unknown; therefore, for modeling purposes it was assumed that shortages of 1.48 maf would continue to be applied at Lake Mead elevations below 1,000 feet unless constrained by infrastructure. The Secretary would ensure appropriate consultation with Basin entities would occur consistent with the Law of the River.

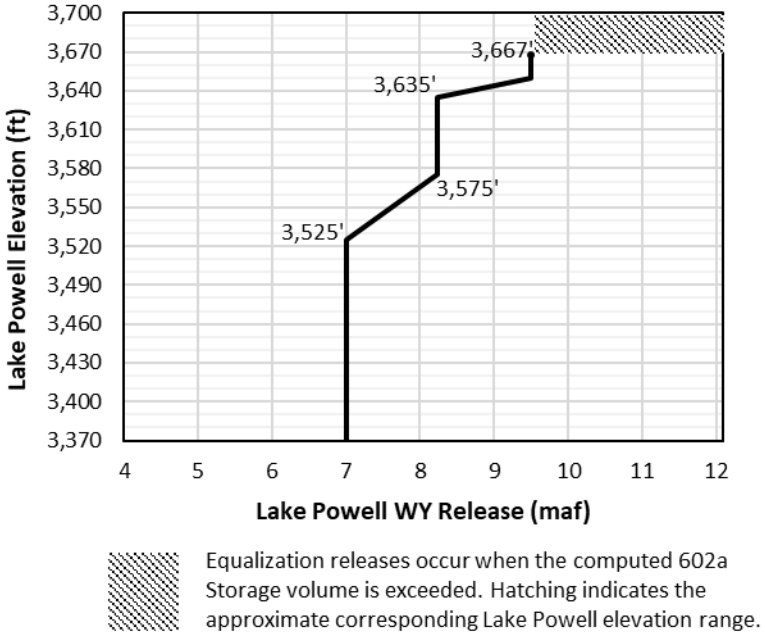
2.5.1.2. Surplus Conditions

Volumes above normal apportionment would be distributed only when criteria are met in Lake Mead for a 70R Surplus Condition or a Flood Control Surplus Condition. (See footnote 11 for details.)

2.5.2 Coordinated Reservoir Operations (Lake Powell and Lake Mead)

The WY release volume from Lake Powell would be based on flexible implementation of the LROC and provides for specified releases both above and below 8.23 maf. The 2007 Interim Guidelines, designed to implement the LROC for an interim period, incorporate such an approach. The operations summarized below and depicted in **Figure 2-4** represent a systematic approach to releasing 8.23 maf while protecting high- and low-elevation infrastructure.

Figure 2-4
Coordinated Operations of Lake Powell and Lake Mead,
Basic Coordination Alternative



2.5.2.1. Primary Operations

- If the October 1 Lake Powell elevation is above elevation 3,650 feet and an Equalization determination has not been made, the WY release would be 9.5 maf.
- If the October 1 Lake Powell elevation is between 3,635 feet and 3,650 feet, the WY release volume linearly increases from 8.23 maf at elevation 3,635 feet to 9.5 maf at elevation 3,650 feet.
- If the October 1 Lake Powell elevation is between 3,575 feet and 3,635 feet, the WY release would be 8.23 maf.

- If the October 1 Lake Powell elevation is between 3,525 feet and 3,575 feet, the WY release volume linearly increases from 7.0 maf at elevation 3,525 feet to 8.23 maf at elevation 3,575 feet.
- If the October 1 Lake Powell elevation is below 3,525 feet, the WY release would be 7.0 maf.

If on October 1 Lake Powell is projected to fall below 3,500 feet within the upcoming WY, Reclamation would consider additional measures as necessary to protect critically low elevations, consistent with the Law of the River.[17]

2.5.2.2. Coordination at High Elevations

A determination to potentially increase releases for the purpose of equalizing storage between Lake Powell and Lake Mead is made for the upcoming year if, on October 1, the net storage of all CRSP reservoirs exceeds the 602(a) storage volume, computed using the parameters from the 2007 Final EIS. **Appendix J**, Sensitivity Analysis – Effects of Assumed Parameter Values on 602(a) Storage, describes the 602(a) storage calculation and documents the parameters used in the 2007 calculation, which are also used in this alternative. **Appendix J** also presents a comparison illustrating how different parameter assumptions would influence the resulting 602(a) storage values. Under Equalization, Lake Powell will release a minimum of 9.5 maf and may release more to balance storage with Lake Mead (see **Appendix A**, CRSS Model Documentation, for details).

2.5.2.3. Infrastructure Protection and Other Considerations

If Lake Powell is projected to fall below 3,490 feet after additional releases are made from CRSP Upper Initial Units (refer to **Section 2.5.4**), Reclamation would consider adjusting operations in consultation with the Basin States to protect critical infrastructure.

2.5.3 Storage and Delivery of Conserved System and Non-System Water

2.5.3.1. Lake Powell and Lake Mead Mechanisms

There would be no new mechanisms to conserve and store water in Lake Powell or Lake Mead since agreements among Basin water users would be required.

2.5.3.2. Treatment of Pre-2027 ICS

ICS created under the 2007 Interim Guidelines and 2019 DCP that remains in Lake Mead in 2027 would be delivered in accordance with existing agreements. Modeling assumptions for the timing of these deliveries can be found in **Appendix B**, Modeling Assumptions: Lake Powell and Lake Mead Storage and Delivery.

[17] This alternative proposes that the Secretary may implement additional measures to protect critical infrastructure at Glen Canyon Dam including further reductions to releases from Lake Powell and additional use of the CRSP Upper Initial Units. The possible outcomes of such measures are unknown; therefore, for modeling purposes it was assumed that Glen Canyon Dam would continue to attempt to release a minimum of 7.0 maf unless constrained by infrastructure. The Secretary would ensure appropriate consultation with Basin entities would occur consistent with the Law of the River.

2.5.4 Additional Activities Above Lake Powell

2.5.4.1. Upper Basin Conservation

No Upper Basin conservation would be included since it would require agreements outside of Reclamation's control.

2.5.4.2. Releases to Protect Glen Canyon Dam

If Lake Powell's physical elevation is projected to go below 3,525 feet, CRSP Upper Initial Units would increase their releases within their RODs to increase elevations at Lake Powell contingent on hydrologic conditions. Reclamation would identify triggers for when additional Upper Basin actions would be required to protect critical infrastructure. Any volumes released for the protection of Glen Canyon Dam would begin to be recovered when Lake Powell is no longer projected to go below 3,525 feet by assuming that the Upper Initial Units return to their normal annual operating targets. The frequency and volumes of the assumed releases to protect Glen Canyon Dam are assessed in **Appendix O**, Analysis of Powell Infrastructure Protection Releases.

2.6 Enhanced Coordination Alternative

The Enhanced Coordination Alternative is based on proposals and concepts from specific Basin Tribes, federal agencies (FWS, NPS, and representing principles put forth by WAPA), and other stakeholders. This alternative seeks to protect critical infrastructure while benefitting key resources (such as environmental, hydropower, and recreation) through an approach to distributing storage between Lake Powell and Lake Mead that enhances the reservoirs' abilities to support the Basin. It applies a pro rata[18] Lower Basin shortage distribution to evaluate the potential impacts of distributing reductions among all mainstream lower Colorado River water users in Arizona, Nevada, and California.

[18] Additional agreements and other legal authorities would be needed to implement any pro rata operations that are inconsistent with the Decree. See **Appendix C**, Shortage Allocation Model and Alternative Distribution Model Documentation, for additional information on considerations related to use of pro rata shortage distributions in alternatives.

2.6.1 Guidelines to Reduce or Increase Deliveries from Lake Mead

2.6.1.1. Shortage Conditions

Shortage volumes up to 3.0 maf would be determined for the upcoming CY based on the October 1 sum of effective[19] storage in Lake Powell and physical storage in Lake Mead and be distributed pro rata among Lower Basin water users independent of state (see **Table 2-3**). Required shortages could be partially or fully offset by delivering or converting previously conserved water, subject to provisions described in **Section 2.6.3**. The shortage guidelines are summarized below and shown in **Figure 2-5**.

- When the sum of Lake Powell effective storage and Lake Mead physical storage is equal to or less than 60 percent of combined capacity and greater than or equal to 30 percent combined capacity, a shortage volume would be imposed for that year based on a function of storage, with 1.3 maf of shortage at 60 percent of capacity increasing linearly to 3.0 maf at 30 percent of capacity.
- When the sum of Lake Powell effective storage and Lake Mead physical storage is less than 30 percent of combined capacity, a shortage volume of 3.0 maf would be imposed for that year.

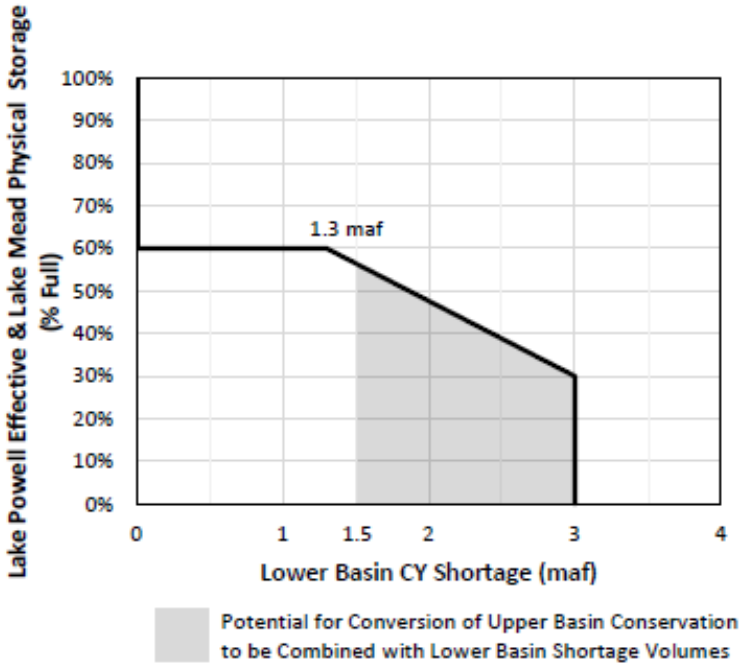
Table 2-3
Shortage Distribution,
Enhanced Coordination Alternative

Entity	Percentage of Total Shortages
Arizona	31.11
California	48.89
Nevada	3.33
Mexico	16.67
Total	**100**

Note: Shortage distributions include modeling assumptions for reductions in water deliveries to Mexico. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

[19] "Effective" elevation or storage is calculated as physical elevation (storage) minus any conserved volume that is held in the respective reservoir.

Figure 2-5
Shortage Guidelines to Reduce Deliveries from Lake Mead, Enhanced Coordination Alternative



Note: Shortage volumes include modeling assumptions for reductions in water deliveries to Mexico. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

The pro rata distribution would occur outside the priority system. Shortages would be distributed on a proportional basis (i.e., at the same percentage reduction from each user's entitlement) across all Lower Basin water users, including Mexico (see **Appendix C**, Shortage Allocation Model and Alternative Distribution Model Documentation, for additional detail on assumptions for this distribution method).

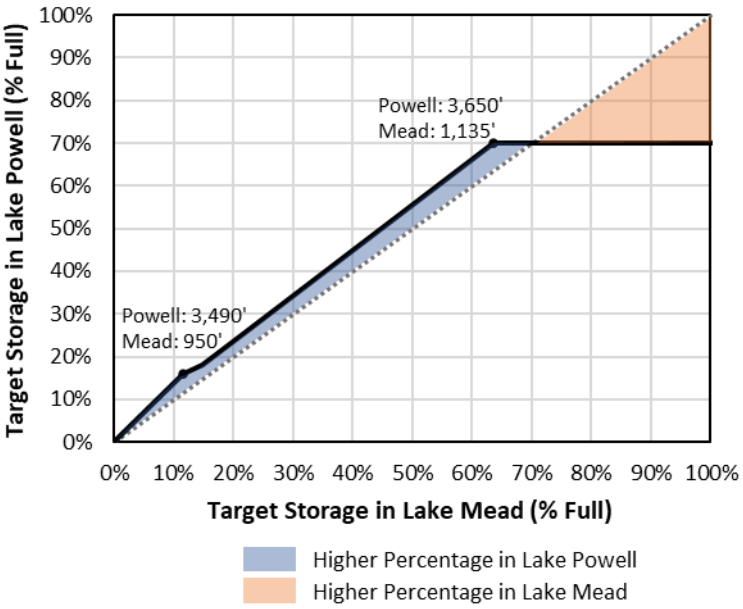
2.6.1.2. Surplus Conditions

Volumes above normal apportionment would be distributed only when criteria are met in Lake Mead for a 70R Surplus Condition or a Flood Control Surplus Condition. (See footnote 11 for details.)

2.6.2 Coordinated Reservoir Operations (Lake Powell and Lake Mead)

Operations would target a specific distribution of storage across Lake Powell and Lake Mead for any given total volume of water. The curve in **Figure 2-6**, called the "target storage distribution curve," depicts the target storage in Lake Powell versus the target storage in Lake Mead. The dotted diagonal line marks a 50/50 split for reference, and the target storage curve is variable across that line, indicating the portion where Lake Powell is at higher percent capacity than Lake Mead (emphasized with blue shading) and the portion where Lake Mead is at higher percent capacity than Lake Powell (emphasized with orange shading). From 0 percent to 63 percent combined storage (the total combined percent full when Lake Powell is at elevation 3,650 feet and Lake Mead is at elevation 1,135 feet), operations would target keeping more water in Lake Powell. Above 63 percent full, a greater portion of water would be proactively sent to Lake Mead to prevent unplanned spill-avoidance releases and protect Glen Canyon Dam at high elevations.

Figure 2-6
Coordinated Operations of Lake Powell and Lake Mead, Enhanced Coordination Alternative



2.6.2.1. Primary Operations

Each year, an initial WY release volume from Lake Powell would be calculated on October 1 using four factors:

1. October 1 physical[20] storage in Lake Powell and Lake Mead
2. Target storage distribution curve in **Figure 2-6**

[20] Using physical storage instead of effective storage for Lake Powell releases would prevent conservation from affecting the intended target storage distribution.

3. Preceding 10-year running average inflow to Lake Powell
4. Lower Basin delivery reductions for the upcoming CY

If the relative storage in Lake Powell and Lake Mead was exactly at the target distribution per the curve, Lake Powell's release would be equal to its 10-year running average inflow minus the volume of Lower Basin shortage for the upcoming CY. Since it is unlikely that the previous year exactly achieved the target storage distribution due to hydrologic uncertainty, a volume equal to the discrepancy, which could be positive (too much water was held in Lake Powell) or negative (too much was released to Lake Mead) would be factored into the upcoming WY release to align storage with the previous year's intended target. The maximum release each month is 900 kaf to prevent large monthly release volumes from causing sand evacuation below Glen Canyon Dam, which can potentially lead to negative impacts on multiple resources in the Grand Canyon. Therefore, the maximum WY release is 10.8 maf to avoid releasing volumes that could cause sediment scouring below Glen Canyon Dam.[21] the minimum WY release is 4.7 maf in accordance with LTEMP.

In the spring, a one-time adjustment would be made to the remaining WY initial release volume if the end-of-water-year forecast shows that the end-of-water-year Lake Powell storage is off target by more than 1.0 maf. This would provide an opportunity to avoid a very large or very small WY release in the subsequent year. If an adjustment is warranted, the volume increase or decrease would be distributed among the remaining 6 months while ensuring that the adjustment would not cause the monthly release to be greater than 900 kaf, or less than the LTEMP minimum flows.

2.6.2.2. Coordination at High Elevations

This alternative is based on a target distribution of storage between Lake Powell and Lake Mead throughout the range of combined storage volumes and does not have specific coordinated operations at high elevations.

2.6.2.3. Infrastructure Protection and Other Considerations

As combined Lake Powell and Lake Mead storage fall, planned WY releases from Lake Powell decline to help protect critical infrastructure at Glen Canyon Dam. No actions to protect critical infrastructure beyond the conservative target storage distribution curve and additional releases from CRSP Upper Initial Units (refer to **Section 2.6.4**) are included in this alternative.

Annual releases above 10.8 maf would be made if required to avoid spills and protect Glen Canyon Dam at high elevations.

At Reclamation's discretion and in coordination with appropriate Basin entities, additional adjustments to Lake Powell WY release volumes could be made to mitigate potential negative impacts to resources between Glen Canyon Dam and Hoover Dam. These adjustments would be reconciled in the subsequent year through the end-of-water-year target storage adjustment.

[21] While sediment scour is often driven by short-duration, high-flow events (i.e., instantaneous flow rates), not by steady-state or annual volumes, incorporating monthly release limits into this alternative helps to ensure that operationally mandated high WY and monthly release volumes do not negatively impact sediment.

2.6.3 Storage and Delivery of Conserved System and Non-System Water

This alternative incorporates specific elements that are designed to provide enhanced flexibility and predictability for water users via a storage and conversion mechanism in Lake Powell and storage and delivery mechanisms in Lake Mead. The storage, conversion and delivery mechanisms include assumptions for contributions of both consumptively used and unused tribal water, which may require additional authorities and represents the concept of enabling Basin Tribes to realize additional benefits from quantified water rights (see **Appendix B**, Modeling Assumptions: Lake Powell and Lake Mead Storage and Delivery of Conserved Water and **Appendix H**, Sensitivity Analysis – Effects of Demand Schedule Assumptions on Modeled Unused Tribal Water Available for Storage in the Enhanced Coordination Alternative).

Three pools capture a range of opportunities to store, convert and deliver water for the benefit of water users and the system: the Lake Powell mechanism, the water user-controlled Lake Mead mechanism, and the Lake Mead Protection Pool, which was informed by a group of Basin Tribes and would be controlled by Reclamation for Lower Basin-wide benefits. The design of these mechanisms supports proactive conservation and water user flexibility while the relatively lower accumulation limits represent a goal of ensuring that system storage is not overtaken by user-controlled conservation.

2.6.3.1. Lake Powell Mechanism

Water conserved by Upper Basin users would be stored in a pool in Lake Powell that can reach a maximum volume of 2.0 maf. Water in this conservation pool would be included for purposes of determining Lake Powell releases but excluded from determinations of shortage volumes until it is converted to system water. Upper Division States and Upper Basin Tribes would have equal access to contribute to the conservation pool and to use their conserved water in intra- and interstate transactions with other Upper Basin users. Upper Basin Tribes would receive credit for the contribution of both conserved consumptive use and unused water to the pool. Assumptions related to contributions to the Lake Powell conservation pool are described in **Section 2.6.4.1**.

Water held in the Lake Powell conservation pool would be converted to system water and combined with Lower Basin shortages to provide system benefits based on the shortage curve in **Figure 2-5**. When Lower Basin CY shortages are greater than 1.5 maf, a volume equal to one-third of the volume above 1.5 maf would be converted from the Lake Powell pool into system water such that the total of Lower Basin shortages and conversion of Upper Basin water equal the required total shortage volume (i.e., above 1.5 maf, there is a 2-to-1 Lower Basin shortage-to-Upper Basin conversion ratio). If the prescribed 2-to-1 volume is not available in the Lake Powell conservation pool, 100 percent of the available volume would be converted, and the Lower Basin would take the balance of shortages.

2.6.3.2. Lake Mead Mechanism

Water conserved by Lower Basin users would be stored in a pool in Lake Mead that can reach a maximum volume of 5.0 maf, which includes the storage of pre-2027 ICS. Annual total and state-based limits for conservation volumes and delivery of conserved water are presented in **Table 2-4**. All conserved water stored in Lake Mead would be included in determinations of Lake Powell releases and shortage volumes. Lower Colorado River entitlement holders, including Lower Basin Tribes, consistent with applicable implementation agreements, would be able to contribute to the conservation pool and to use their conserved water for delivery and/or in intra- and interstate transactions with other Lower Basin users.

Table 2-4
Volume Limitations of Storage and Delivery of Conserved Water, Enhanced Coordination Alternative

Entity	Maximum Annual Contribution (kaf)	Maximum Cumulative Storage (kaf)	Maximum Annual Conversion or Delivery (kaf)
Arizona	466.67	700	620
California	733.333	1,900	980
Nevada	50	700	70
Mexico	250	1,700	330*
Total	**1,500**	**5,000**	**2,000**

*According to the modeling assumption for Mexico, water stored in the bank may only be used to mitigate Mexico's reductions exceeding 250 kaf. This activity is considered a "delivery" (i.e., conversion) from the bank. As a result, banking activity will not cause Mexico's delivery to exceed 1.7 maf. The 1944 Water Treaty authorizes scheduled delivery of up to 200 kaf in excess of the 1.5 annual allotment to Mexico.
Note: Volumes include modeling assumptions for Mexico's storage and delivery limits. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

Water users could contribute and convert or deliver water previously stored under this new mechanism at their discretion within the annual volume constraints related to the pool. At the time the water is conserved, a one-time, seven-percent assessment would be deducted from the conserved volume and added to the Protection Pool. Conserved water could be used to offset up to 1.5 maf of required shortages. Conversion and delivery of conserved water would not be allowed when Lake Mead's physical elevation is below 1,025 feet.

2.6.3.3. Lake Mead Mechanism (Protection Pool)

The Protection Pool would be a pool of water controlled by Reclamation that can reach a maximum volume of 2.0 maf. It would acquire water through multiple mechanisms, including but not limited to system assessments on water user-created conservation, potentially compensated Lower Basin tribal water (conserved consumptive use and unused), system efficiency projects and potentially compensated nontribal conservation. Contents of the Protection Pool would be included in determinations of Lake Powell releases and shortage volumes.

The Protection Pool could be used for a range of purposes, including, but not limited to, meeting federal firming obligations,[22] other federal delivery obligations, protecting Lower Basin water supplies, protecting infrastructure, and providing environmental benefits. Modeling assumptions related to logic for creation and use of Protection Pool volumes can be found in **Appendix B**, Modeling Assumptions: Lake Powell and Lake Mead Storage and Delivery of Conserved Water. There are no annual creation or delivery constraints.

The Protection Pool was designed with significant input from representatives of Basin Tribes. The elements are modeled within the Enhanced Coordination Alternative, but the intention is to allow for their implementation within any operational framework that includes a storage and delivery mechanism (including frameworks where conservation is excluded from all release and shortage determinations).

2.6.3.4. Treatment of Pre-2027 ICS

ICS created under the 2007 Interim Guidelines and 2019 DCP that remains in Lake Mead in 2027 would be transferred to the Post-2026 Lake Mead water user-controlled mechanism immediately and would be subject to all provisions described in the previous section.

2.6.4 Additional Activities Above Lake Powell

2.6.4.1. Upper Basin Conservation

Exact volumes of Upper Basin conservation over time are uncertain, but for the purposes of modeling, volumes up to a maximum volume per year may be added depending on hydrologic conditions. The maximum phases in over time: from 2027 to 2031, the maximum is 200 kaf; from 2032-2036, the maximum is 275 kaf; after 2036, the maximum is 350 kaf. Conservation is modeled as a single lumped volume; no assumptions are made with respect to contributions from different entities or via specific activities. Assumptions related to the storage of unused Upper Basin tribal water are included in these volumes.

2.6.4.2. Releases to Protect Glen Canyon Dam

The coordinated operations included in this alternative, due to their storage distribution approach and lower releases at Lake Powell (down to 4.7 maf) are very effective at protecting critical infrastructure at Glen Canyon Dam. Therefore, while specific assumptions for releases from CRSP Upper Initial Units have not been developed for this alternative, Reclamation maintains the authority to operate its reservoirs to protect Glen Canyon Dam infrastructure.

2.7 Maximum Operational Flexibility Alternative

The Maximum Operational Flexibility Alternative is informed by a proposal submitted by a consortium of conservation organizations. This alternative incorporates proactive responses, targeted reservoir management strategies, and innovative and flexible tools to address an increasingly

[22] The Secretary is obligated to firm certain volumes of CAP non-Indian agricultural water provided as part of Indian water rights settlements to specific tribes in Arizona, under Section 105(a) of the Arizona Water Settlements Act of 2004, Pub. L. 108-451, 118 Stat. 3478.

variable set of future hydrologic conditions. The operations are designed to help stabilize system storage, incentivize proactive water conservation, and extend the benefits of conservation and operational flexibility to a wide range of resources.

This alternative is based on "dual indicator" operations for determining annual releases from Lake Powell and Lake Mead: system storage and recent hydrology[23] are used in combination to determine operations. Additionally, it introduces the Conservation Reserve as a flexible tool for water conservation and management.

2.7.1 Guidelines to Reduce or Increase Deliveries from Lake Mead

2.7.1.1. Shortage Conditions

Shortage volumes up to 4.0 maf would be determined for the upcoming CY based on October 1 total system[24] effective storage and the previous 3-year average natural flow at Lees Ferry, Arizona. Shortages would be distributed based on priority as described in Approach 1 of the Supply Driven Alternative (refer to **Section 2.8.1**). Required shortages could be partially or fully offset by delivering or converting previously conserved water, subject to provisions described in **Section 2.7.2.2**. The shortage guidelines and relevant conditions are summarized below and shown in **Figure 2-7** and **Table 2-5**.

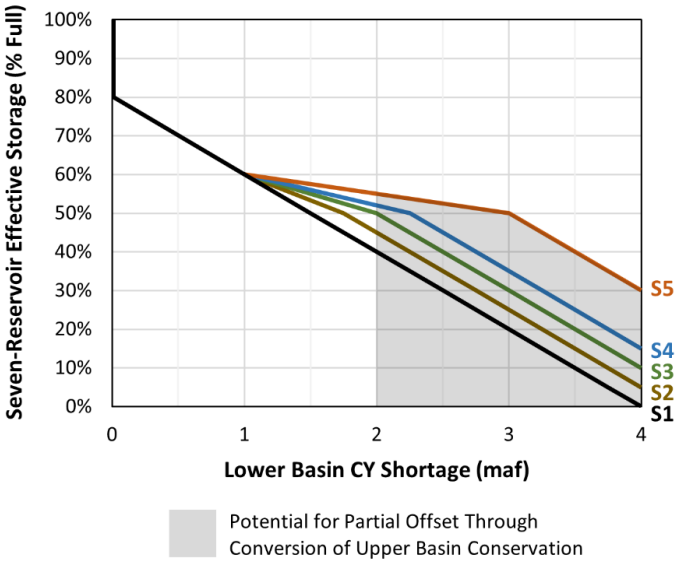
- When total system effective storage is at or below 80 percent of capacity and at or above 60 percent of capacity, a shortage volume would be imposed for that year based on a function of storage, with 0.0 maf of shortage at 80 percent of capacity increasing linearly to 1.0 maf at 60 percent of capacity.
- When total system effective storage is below 60 percent of capacity and at or above 50 percent of capacity, the shortage volume depends on the previous 3-year average Lees Ferry natural flow:
  - If the previous 3-year average Lees Ferry natural flow is greater than 14.0 maf, a shortage volume would be imposed for that year based on a function of storage, with 1.0 maf of shortage at 60 percent of capacity increasing linearly to 1.5 maf at 50 percent of capacity (S1 curve in **Figure 2-7**).
  - If the previous 3-year average Lees Ferry natural flow is less than 14.0 maf and greater than or equal to 12.0 maf, a shortage volume would be imposed for that year based on a function of storage, with 1.0 maf of shortage at 60 percent of capacity increasing linearly to 1.75 maf at 50 percent of capacity (S2 curve in **Figure 2-7**).
  - If the previous 3-year average Lees Ferry natural flow is less than 12.0 maf and greater than or equal to 10.0 maf, a shortage volume would be imposed for that year based on a function of storage, with 1.0 maf of shortage at 60 percent of capacity increasing linearly to 2.0 maf at 50 percent of capacity (S3 curve in **Figure 2-7**).

[23] The submission by the conservation organizations proposes the use of a Climate Response Indicator as part of the "dual indicator" approach. For modeling purposes, this concept has been translated into the previous 3-year average Lees Ferry natural flow.
[24] Flaming Gorge, Blue Mesa, Navajo, Lake Powell, Lake Mead, Lake Mohave, and Lake Havasu reservoirs.

  - If the previous 3-year average Lees Ferry natural flow is less than 10.0 maf and greater than or equal to 8.0 maf, a shortage volume would be imposed for that year based on a function of storage, with 1.0 maf of shortage at 60 percent of capacity increasing linearly to 2.25 maf at 50 percent of capacity (S4 curve in **Figure 2-7**).
  - If the previous 3-year average Lees Ferry natural flow is less than 8.0 maf, a shortage volume would be imposed for that year based on a function of storage, with 1.0 maf of shortage at 60 percent of capacity increasing linearly to 3.0 maf at 50 percent of capacity (S5 curve in **Figure 2-7**).

- When total system effective storage is 50 percent of capacity or less, the shortage volume depends on the previous 3-year average Lees Ferry natural flow:
  - If the previous 3-year average Lees Ferry natural flow is greater than 14.0 maf, a shortage volume would be imposed for that year based on a function of storage, with 1.5 maf of shortage at 50 percent of capacity increasing linearly to 4.0 maf at 0 percent of capacity (S1 curve in **Figure 2-7**).
  - If the previous 3-year average Lees Ferry natural flow is less than 14 maf and greater than or equal to 12.0 maf, a shortage volume would be imposed for that year based on a function of storage, with 1.75 maf of shortage at 50 percent of capacity increasing linearly to 4.0 maf at 5 percent of capacity (S2 curve in **Figure 2-7**). Below 5 percent of capacity, a shortage of 4.0 maf would be imposed for that year.
  - If the previous 3-year average Lees Ferry natural flow is less than 12.0 maf and greater than or equal to 10.0 maf, a shortage volume would be imposed for that year based on a function of storage, with 2.0 maf of shortage at 50 percent of capacity increasing linearly to 4.0 maf at 10 percent of capacity (S3 curve in **Figure 2-7**). Below 10 percent of capacity, a shortage of 4.0 maf would be imposed for that year.
  - If the previous 3-year average Lees Ferry natural flow is less than 10.0 maf and greater than or equal to 8.0 maf, a shortage volume would be imposed for that year based on a function of storage, with 2.25 maf of shortage at 50 percent of capacity increasing linearly to 4.0 maf at 15 percent of capacity (S4 curve in **Figure 2-7**). Below 15 percent of capacity, a shortage of 4.0 maf would be imposed for that year.
  - If the previous 3-year average Lees Ferry natural flow is less than 8.0 maf, a shortage volume would be imposed for that year based on a function of storage, with 3.0 maf of shortage at 50 percent of capacity increasing linearly to 4.0 maf at 30 percent of capacity (S5 curve in **Figure 2-7**). Below 30 percent of capacity, a shortage of 4.0 maf would be imposed for that year.

Figure 2-7
Shortage Guidelines to Reduce Deliveries from Lake Mead, Maximum Operational Flexibility Alternative



Note: Shortage volumes include modeling assumptions for reductions in water deliveries to Mexico. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

Table 2-5
Shortage Curves and Relevant Conditions, Maximum Operational Flexibility Alternative

Shortage Curve	Previous 3-Year Average Lees Ferry Natural Flow (maf)	Shortage Increase Compared to S1 Curve at 50% Full (kaf)
S1	≥ 14	N/A
S2	< 14 to ≥ 12	250
S3	< 12 to ≥ 10	500
S4	< 10 to ≥ 8	750
S5	< 8	1,500

2.7.1.2. Surplus Conditions

Volumes above normal apportionment would be distributed only when criteria are met in Lake Mead for a Flood Control Surplus Condition.

2.7.2 Coordinated Reservoir Operations (Lake Powell and Lake Mead)

The WY release from Lake Powell would be determined based on the combined effective storage of CRSP reservoirs (Lake Powell, Flaming Gorge, Blue Mesa, and Navajo) on October 1 and the

previous 3-year average natural flow at Lees Ferry, Arizona. The operational zones and relevant conditions are summarized below and shown in **Figure 2-8** and **Table 2-6**.

Figure 2-8
Coordinated Operations of Lake Powell and Lake Mead,
Maximum Operational Flexibility Alternative

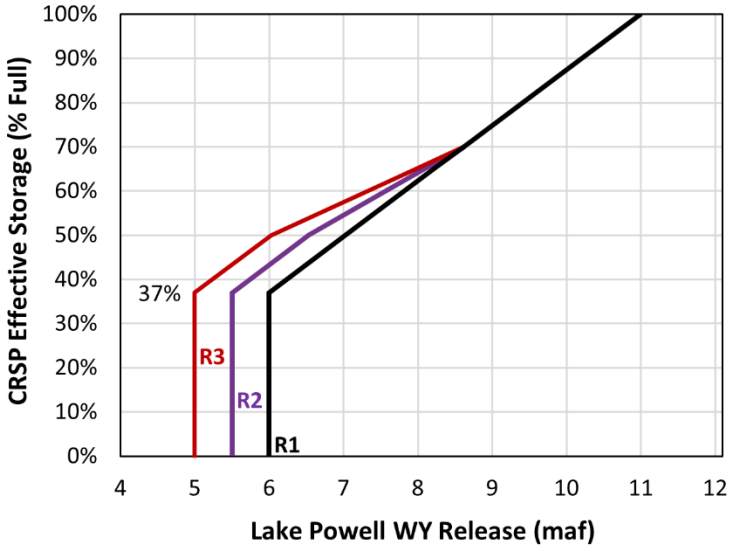


Table 2-6
Release Curves and Relevant Conditions,
Maximum Operational Flexibility Alternative

Lake Powell Release Curve	Previous 3-Year Average Lees Ferry Natural Flow (maf)	Release Decrease Compared to R1 Curve at 50% Full (kaf)
R1	≥ 10	N/A
R2	< 10 to ≥ 8	500
R3	< 8	1,000

2.7.2.1. Primary Operations

- When CRSP effective storage is at or below 100 percent of capacity and at or above 70 percent of capacity, a release volume would be determined for that year based on a function of storage, with 11.0 maf release at 100 percent of capacity decreasing linearly to 8.6 maf at 70 percent of capacity.
- When CRSP effective storage is at or below 70 percent of capacity and at or above 50 percent of capacity, the release volume depends on the previous 3-year average Lees Ferry natural flow:
  - If the previous 3-year average Lees Ferry natural flow is greater than or equal to 10.0 maf, a release volume would be determined for that year based on a function of storage,

with a release of 8.6 maf at 70 percent of capacity decreasing linearly to 7.0 maf at 50 percent of capacity (R1 curve in **Figure 2-8**).

  - If the previous 3-year average Lees Ferry natural flow is less than 10.0 maf and greater than or equal to 8.0 maf, a release volume would be determined for that year based on a function of storage, with a release of 8.6 maf at 70 percent of capacity decreasing linearly to 6.5 maf at 50 percent of capacity (R2 curve in **Figure 2-8**).
  - If the previous 3-year average Lees Ferry natural flow is less than 8.0 maf, a release volume would be determined for that year based on a function of storage, with a release of 8.6 maf at 70 percent of capacity decreasing linearly to 6.0 maf at 50 percent of capacity (R3 curve in **Figure 2-8**).

- When CRSP effective storage is at or below 50 percent of capacity, the release volume depends on the previous 3-year average Lees Ferry natural flow:
  - If the previous 3-year average Lees Ferry natural flow is greater than or equal to 10.0 maf, a release volume would be determined for that year based on a function of storage, with a release of 7 maf at 50 percent of capacity decreasing linearly to 6.0 maf at 37 percent of capacity (R1 curve in **Figure 2-8**). Below 37 percent of capacity, the determined release would be 6.0 maf.
  - If the previous 3-year average Lees Ferry natural flow is less than 10.0 maf and greater than or equal to 8.0 maf, a release volume would be determined for that year based on a function of storage, with a release of 6.5 maf at 50 percent of capacity decreasing linearly to 5.5 maf at 37 percent of capacity (R2 curve in **Figure 2-8**). Below 37 percent of capacity, the determined release would be 5.5 maf.
  - If the previous 3-year average Lees Ferry natural flow is less than 8.0 maf, a release volume would be determined for that year based on a function of storage, with a release of 6.0 maf at 50 percent of capacity decreasing linearly to 5.0 maf at 37 percent of capacity (R3 curve in **Figure 2-8**). Below 37 percent of capacity, the determined release would be 5.0 maf.

2.7.2.2. Coordination at High Elevations

This alternative uses the Conservation Reserve pool to coordinate Lake Powell and Lake Mead throughout the range of elevations and does not have specific coordinated operations at high elevations.

2.7.2.3. Infrastructure Protection and Other Considerations

When physical elevation at Lake Powell is below 3,510 feet, Lake Powell monthly releases would be equal to the minimum of either monthly inflow minus losses or the monthly volume corresponding to the WY release determined by the curve. The minimum monthly release would be based on 5,000 cubic feet per second (cfs) unless it is reduced by Glen Canyon Dam infrastructure constraints below physical elevation 3,490 feet.

Lake Powell WY releases could be adjusted based on flexibilities provided by the Conservation Reserve as described in **Section 2.7.3**.

2.7.3 Storage and Delivery of Conserved System and Non-System Water

2.7.3.1. Combined Lake Powell and Lake Mead Mechanism

The Conservation Reserve is a pool that would store water conserved by Colorado River water users in either basin (including Mexico) and would be distributed strategically across Lake Powell and Lake Mead to protect infrastructure and benefit a range of resources including the Colorado River Delta, LCR MSCP, and Grand Canyon. Except when Lake Powell or Lake Mead is near a critically high or low elevation, water in the Conservation Reserve would be excluded from determining basic (curve-based) WY releases from Lake Powell and shortage volumes until it is converted to system water. The timing and volume criteria for this conversion are described below.

The maximum volume of the Conservation Reserve would be 8.0 maf, with 3.0 maf of space allocated to Upper Basin users and 5.0 maf allocated to Lower Basin users, which includes the storage of pre-2027 ICS. There would be no maximum total storage for any single user or state, though there would be total annual creation and delivery limits as shown in **Table 2-7**. At the time the water is conserved, a one-time 10-percent assessment would be deducted from the conserved volume and added to system water. Transactions, including interstate transactions, could occur between users within the basin of origin.

Table 2-7
Annual Total Conservation Creation and Delivery or Conversion Limits by Basin

Basin	Maximum Annual Contribution Limits (kaf)	Maximum Annual Delivery or Conversion Limits (kaf)
Upper	500	Conversion volume required to bring Lower Basin shortage to 2.0 maf
Lower	3,000 minus shortage (total of shortage and creation cannot exceed 3,000)	3,000

Note: Volumes include modeling assumptions for Mexico's storage and delivery limits. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

Reclamation would determine how to allocate the Conservation Reserve volume between reservoirs and could increase or decrease Lake Powell's basic WY release volume to meet infrastructure needs or resource goals. Operation of the Conservation Reserve would not affect tracking of Lee Ferry flows.

Upper Basin users' conserved water would be converted to system water based on the shortage curve in **Figure 2-8**. When Lower Basin shortages are greater than 2.0 maf, the volume above 2.0 maf would be converted from Upper Basin users' Conservation Reserve water to system water, subject to availability in the Reserve. The required Lower Basin shortage volume would be reduced by whatever volume of previously conserved Upper Basin water is converted.

Lower Basin water users could conserve and request delivery of stored water in their accounts at their discretion to offset up to the full required shortage amount, subject to annual creation and delivery limits and constrained by the priority of using Conservation Reserve water to keep Lake Powell above 3,510 feet and Lake Mead above 1,000 feet.

2.7.3.2. Treatment of Pre-2027 ICS

ICS created under the 2007 Interim Guidelines and 2019 DCP that remains in Lake Mead in 2027 would be transferred to the Conservation Reserve in 2027 and would be subject to all provisions described in the previous section.

2.7.4 Additional Activities Above Lake Powell

2.7.4.1. Upper Basin Conservation

Exact volumes of Upper Basin conservation over time are uncertain, but for the purposes of modeling, volumes up to 500 kaf per year may be added depending on hydrologic conditions. The framework targets an average conservation volume of 200 kaf per year. Conservation is modeled as a single lumped volume; no assumptions are made with respect to contributions from different entities or via specific activities.

2.7.4.2. Releases to Protect Glen Canyon Dam

Based on the proposal submitted by the conservation organizations on which this alternative is based, this alternative does not include adjustments to the releases of the CRSP Upper Initial Units to protect infrastructure at Glen Canyon Dam. However, Reclamation maintains the authority to operate these reservoirs to protect Glen Canyon Dam infrastructure.

2.8 Supply Driven Alternative

The Supply Driven Alternative provides a Lake Powell operation based solely on historical natural flow. It also incorporates concepts from the separate proposals submitted by the Upper Division and Lower Division States, as well as ideas emerging from discussions with the Basin States during spring 2025. In this alternative, annual Lake Powell releases would be determined based on a set percentage of the preceding 3-year average natural flow at Lees Ferry, and Lower Basin deliveries would be determined based on Lake Mead elevation.

2.8.1 Guidelines to Reduce or Increase Deliveries from Lake Mead

2.8.1.1. Shortage Conditions

Shortage volumes up to 2.1 maf would be determined for the upcoming CY based on August 1 Lake Mead effective elevation. To analyze a wide range of potential impacts, at the request of the Lower Division States, this alternative will consider two different approaches to the distribution of shortages among mainstream Lower Colorado River users:

1. Lower Basin Priority (LB Priority): up to 1.5 maf, intra-state priority using state distributions submitted by Lower Division States; above 1.5 maf, priority using a state

distribution based on the interpretation of priority as described in the No Action Alternative (**Section 2.4.1.1**).

2. Lower Basin Pro Rata (LB Pro Rata): up to 1.5 maf, intra-state pro rata using state distributions submitted by Lower Division States; above 1.5 maf, intra-state pro rata distributed to states proportionally based on unreduced apportionments.

Table 2-8 reports how shortage volumes would be divided among the states and Mexico for each approach up to 1.5 maf. **Appendix C**, Shortage Allocation Model and Alternative Distribution Model Documentation, includes the results of additional modeling to understand how excluding tribes from shortages in both distribution schemes would impact water deliveries.

Table 2-8
Lower Division State-Submitted Shortage Distributions

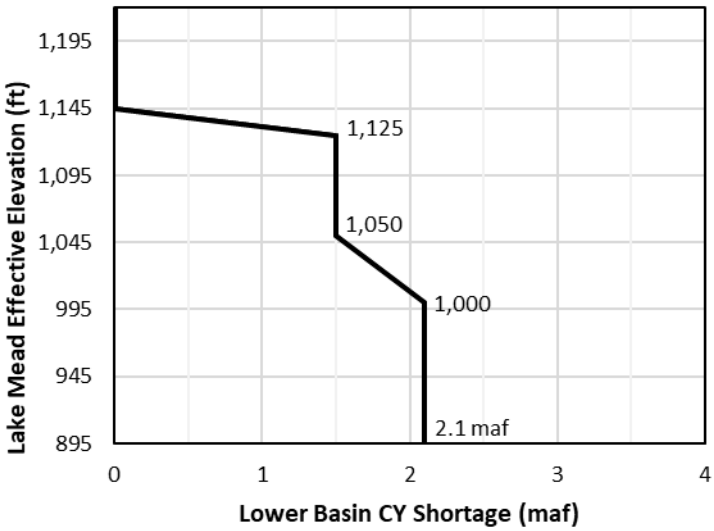
Entity	Shortage (%) from 0 to 300 kaf	Shortage (%) from 300 to 1,500 kaf	Total Shortage (kaf) when Lower Basin-wide Shortage is 1,500 kaf	Shortage (%) 1,500 kaf to 2,100 kaf	
	LB Priority and LB Pro Rata	LB Priority and LB Pro Rata	LB Priority and LB Pro Rata	LB Priority	LB Pro Rata
Arizona	80.00	43.33	760	76.26	27.20
California	0	36.67	440	0	52.80
Nevada	3.33	3.33	50	7.08	3.33
Mexico	16.67	16.67	250	16.67	16.67

Note: Shortage distributions include modeling assumptions for reductions in water deliveries to Mexico. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

Required shortages could be partially or fully offset by delivering or converting previously conserved water, subject to provisions described in **Section 2.8.3**. The shortage guidelines are summarized below and shown in **Figure 2-9**.

- When Lake Mead effective elevation is at or below 1,145 feet and at or above 1,125 feet, a shortage volume would be imposed for that year based on a function of elevation, with 0.0 maf of shortage at 1,145 feet increasing linearly to 1.5 maf at 1,125 feet.
- When Lake Mead effective elevation is at or below 1,125 feet and at or above 1,050 feet, a shortage volume of 1.5 maf would be imposed for that year.
- When Lake Mead effective elevation is at or below 1,050 feet and at or above 1,000 feet, a shortage volume would be imposed for that year based on a function of elevation, with 1.5 maf of shortage at 1,050 feet increasing linearly to 2.1 maf at 1,000 feet.
- When Lake Mead effective elevation is below 1,000 feet a shortage volume of 2.1 maf would be imposed for that year.

Figure 2-9
Shortage Guidelines to Reduce Deliveries from Lake Mead, Supply Driven Alternative



Note: Shortage volumes include modeling assumptions for reductions in water deliveries to Mexico. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

2.8.1.2. Surplus Conditions

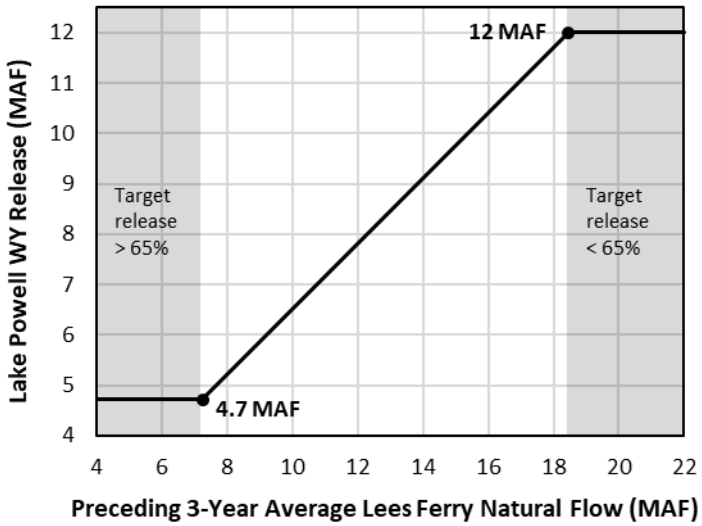
This alternative incorporates three categories of surplus: Flood Control and 70R, which are described in **Section 2.4.1.2**, and Domestic Surplus. A Domestic Surplus would be determined anytime the August 1 Lake Mead effective elevation is at or above 1,165 feet and Flood Control or 70R Surplus is not triggered. Up to 500 kaf of surplus volumes would be distributed.

2.8.2 Coordinated Reservoir Operations (Lake Powell and Lake Mead)

2.8.2.1. Primary Operations

Lake Powell WY release volumes would be determined on October 1 as a fixed percentage (65 percent) of the preceding 3-year average natural flow at Lees Ferry, Arizona (see **Figure 2-10**). **Appendix D**, Sensitivity Analysis – Effects of Natural Flow Percentage Used for the Supply Driven Alternative, explores the implications of using different natural flow percentages. Other than considerations related to critical high or low elevations, WY releases would be constrained to between 12.0 maf and 4.7 maf regardless of the volume determined by the natural flow-based calculation.

Figure 2-10
Coordinated Operations of Lake Powell and Lake Mead,
Supply Driven Alternative



2.8.2.2. Coordination at High Elevations

This alternative does not coordinate operations at high elevations.

2.8.2.3. Infrastructure Protection and Other Considerations

This alternative assumes that no adjustments to Lake Powell releases would be made to protect physical elevation 3,490 feet; however, Reclamation maintains the authority to modify operations to protect Glen Canyon Dam infrastructure.

2.8.3 Storage and Delivery of Conserved System and Non-System Water

2.8.3.1. Lake Powell Mechanism

Water conserved by Upper Basin users would be stored in a pool in Lake Powell that could reach a maximum volume of 3.0 maf. Upper Division States' water and Upper Basin Tribes' water would be able to contribute to the conservation pool and to use their conserved water in intra- and interstate transactions with other Upper Basin users. Water in the Lake Powell conservation pool can be released if needed to meet the determined WY volume.

2.8.3.2. Lake Mead Mechanism

Water conserved by Lower Basin users would be stored in a pool in Lake Mead that could reach a maximum volume of 8.0 maf, which includes the storage of pre-2027 ICS. Annual total and state-based limits for conservation volumes and delivery of conserved water are presented in **Table 2-9**, but each state can choose to share its dedicated space. All water stored in the Lake Mead conservation pool would be excluded from determinations of shortage volumes until it is converted to system water by a user to offset their required shortages. Lower Colorado River entitlement holders, including Lower Basin Tribes, consistent with applicable implementation agreements, would be able to contribute to the Lake Mead conservation pool and to use their conserved water in intra- and interstate transactions with other Lower Basin users.

Water users could contribute and convert or deliver water previously stored under this new mechanism at their discretion within the annual volume constraints related to the pool. In the year the water is conserved, a 5-percent assessment would be deducted from the conserved volume and added to system water. In every subsequent year, 3 percent of the stored volume would be deducted and converted to system water. Delivery of conserved water would not be allowed when Lake Mead's physical elevation is below 1,025 feet.

Table 2-9
Supply Driven Alternative Volume Limitations of Storage of Conserved Water

Entity	Maximum Annual Contribution (kaf)	Maximum Cumulative Storage (kaf)	Maximum Annual Conversion or Delivery (kaf)
Arizona	880	3,000	465
California	880	3,000	745
Nevada	225	1,000	90
Mexico	500	1,000	100
Total	**2,485**	**8,000**	**1,400**

Note: Volumes include modeling assumptions for Mexico's storage and delivery limits. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

2.8.3.3. Treatment of Pre-2027 ICS Conservation

ICS created under the 2007 Interim Guidelines and 2019 DCP that remains in Lake Mead in 2027 would be used or converted to the Post-2026 Lake Mead mechanism using a phased approach over 10 years. Once transferred to the new mechanism, it would be subject to all provisions described in the previous section.

2.8.4 Additional Activities Above Lake Powell

2.8.4.1. Upper Basin Conservation

Exact volumes of Upper Basin conservation over time are uncertain, but for the purposes of modeling, conservation up to 200 kaf per year is included, with variable annual volumes based on hydrologic conditions as described in Enhanced Coordination. Conservation is modeled as a single lumped volume; no assumptions are made with respect to contributions from different entities or via specific activities. Additional hydrology-dependent volumes may be added to the Lake Powell pool based on annual unused Upper Basin tribal water.

2.8.4.2. Releases to Protect Glen Canyon Dam

If Lake Powell's elevation falls below 3,525 feet CRSP Upper Initial Units would increase their releases within their RODs to increase elevations at Lake Powell, up to 500 kaf per year contingent on hydrologic conditions. Any volumes released for the protection of Glen Canyon Dam would begin to be recovered when Lake Powell is above 3,535 feet by assuming that the Upper Initial Units return to their normal annual operating targets. The frequency and volumes of the assumed releases to protect Glen Canyon Dam are assessed in **Appendix O**, Analysis of Powell Infrastructure Protection Releases.

2.8.4.3. Additional Modeling Assumptions

In years when Lake Powell cannot meet its required WY release because of low elevation infrastructure constraints, additional water is introduced into the system to (partially) make up the shortfall. For modeling purposes, this supplemental volume is termed "gap water." Gap water is injected into Lake Powell and released when conditions allow, subject to the same low-elevation release constraints. Any portion not released in a given WY is tracked as carryover and released in subsequent years. The annual amount of gap water is limited to no more than 23 percent[25] of the Upper Basin's modeled depletion for that year, minus any Upper Basin conservation that occurs or any releases from the CRSP Upper Initial Units. Additional detail is provided in **Appendix A**, CRSS Model Documentation.

2.9 Alternatives Considered but Eliminated from Detailed Analysis

Reclamation received a number of submissions representing commenters' proposed operations of Colorado River reservoirs. Some submissions presented sufficient detail to potentially be considered as an action alternative, while others offered operational concepts or components of an alternative. In either case, the following "alternatives" were brought forward during internal and public scoping. These alternatives were considered but eliminated from detailed analysis because they (1) would not fully meet the purpose and need of the Post-2026 action; (2) are infeasible or inconsistent with the

[25] The 23-percent limit is based on the ratio of the maximum Lower Basin shortage (2.1 maf) to the total Lower Basin apportionment to the U.S. and Mexico (9.0 maf).

policy objectives for Colorado River operations, including consistency with applicable federal law;[26] or (3) are addressed or encompassed by the range of alternatives analyzed.

2.9.1 Boating Alternative – Maintaining Lake Powell Levels for Recreation

Comments related to boating alternatives focused on maintaining water levels at Lake Powell (and Lake Mead) to serve recreational boating needs. Many commenters wrote in support of the BlueRibbon Coalition's "Path to 3588' Plan," which proposes to maintain Lake Powell at an elevation of 3,588 feet. One commenter proposed maintaining Lake Powell at 3,600 feet, and three commenters proposed filling Lake Powell to full pool. Other commenters suggested maintaining Lake Powell at an elevation of 3,588 feet to allow the Castle Rock Cut to be navigable. Additionally, some commenters asked that Reclamation reconsider how release rates are determined—one noted potential effects on the trout fishery below Glen Canyon Dam, while another recommended evaluating minimum flows of 8,000 cfs from April 1 through September 22 to preserve safe whitewater boating below the dam.

This alternative was not carried forward because a recreation-focused target elevation does not fully meet the purpose and need of the Post-2026 action. Focusing solely on boating would risk noncompliance with water delivery obligations and operational requirements, which would be inconsistent with Reclamation's policy objectives. However, maintenance of higher Lake Powell elevations, as feasible, is integrated into the range of alternatives, primarily the Enhanced Coordination Alternative and Maximum Operational Flexibility Alternative. These operations were designed in recognition of their potential to benefit multiple resources and uses, including recreation. With respect to minimum flows below Glen Canyon Dam, targeting specific releases from Lake Powell at the sub-annual level is outside the scope of this NEPA effort, which is focused on annual releases.

2.9.2 Ecosystem Alternative

Comments regarding an ecosystem alternative called for Reclamation to prioritize the ecosystem health of the Colorado River by protecting key components such as wildlife, vegetation, habitats, tributary ecosystems, and wetlands. Specific wildlife habitats mentioned included the Grand Canyon, the Lower Colorado River, the Salton Sea, and the Colorado River Delta. Several commenters emphasized that consumptive water use from agriculture, lawns, and golf courses be decreased to protect these habitats. In addition, one commenter suggested that Reclamation analyze and implement releases of cold water with high dissolved oxygen from Glen Canyon Dam to protect the threatened humpback chub, noting that low water levels at Lake Mead creating the Pearce Ferry rapid may serve as an effective management strategy for protecting native and listed fish species. Another commenter urged the development of a "Protect Grand Canyon Alternative" to "ensure High-Flow Experiments, safe and navigable flows, a healthy ecosystem including protecting the sediment resource and our native fish and preserving precious cultural resources in this sacred landscape."

[26] Inclusive of existing legal authorities and contractual obligations. This would not preclude the reasonably foreseeable acquisition of certain new or modified legal authorities necessary to implement new interim guidelines. However, new legal authorities that would result in impracticalities or are unlikely to be widely acceptable among stakeholders are too speculative to include in this Draft EIS.

Critical ecosystem needs were considered in the development of every action alternative. However, this Ecosystem Alternative was not advanced because it does not fully resolve the operational and legal requirements for managing Colorado River water. An ecosystem-based alternative would also include cuts to water allocations and implementation of water conservation measures. Any operation would need to meet the applicable ecosystem-based requirements under applicable law or would require extensive and contentious modifications to law and contracts to be implementable.

2.9.3 One-Dam Alternative

Reclamation received comments related to one-dam alternatives focused on prioritizing the preservation of one dam and its reservoir—either Hoover Dam/Lake Mead or Glen Canyon Dam/Lake Powell—over the other. The majority of commenters supported an alternative that would prioritize filling Lake Mead, either by bypassing or decommissioning Glen Canyon Dam. Several commenters referenced maintaining Lake Powell at 3,550 feet and sending all excess water to Lake Mead. Others noted that low water levels in Lake Powell could result in additional resources emerging from Glen Canyon and called for these impacts to be considered. Additionally, three commenters expressed support for a "Grand Canyon Restoration Alternative"—such as a bypass tunnel around Glen Canyon Dam—to ensure high-flow experiments that protect both ecosystem and cultural resources, while four commenters supported preserving Lake Powell for recreation.

This alternative was not advanced because prioritizing one dam over the other would not yield an integrated, resilient system. Such a focus would undermine the balanced operations required to meet water delivery, environmental, and legal obligations under the Post-2026 action. Reclamation operates and maintains the two dams and reservoirs consistent with Law of the River, including the 1928 BCPA that authorized the construction of Hoover Dam and the CRSPA that authorized the construction of Glen Canyon Dam, and all acts amendatory and supplemental. A one-dam alternative would require such extensive statutory modifications or amendments that it is unlikely to be acceptable among stakeholders and would be inconsistent with federal law.

2.10 Summary Comparison of Alternatives

<table>
<tr><td>No Action Alternative</td><td colspan="5">The No Action Alternative is included as a requirement of NEPA. Operations would revert to annual determinations announced through the Annual Operating Plan. Pursuant to the LROC, the objective is to maintain a minimum release of water from Lake Powell of 8.23 maf, therefore Lake Powell releases are assumed to be 8.23 maf[1] unless a higher release is required for equalization or a lower release occurs due to Glen Canyon Dam infrastructure limitations.[2] Shortages to the Lower Basin would be based on priority and reach a maximum of 600 thousand acre-feet (kaf). This would not represent a continuation of current operations but is generally based on the operating guidance that was in place before the adoption of the 2007 Interim Guidelines. While the authority to use CRSP Upper Initial Units to respond to exigent and emergency conditions was recognized at that time, no specific framework for such activities had been developed, so no defined activities are included in this alternative. Existing Intentionally Created Surplus (ICS) would be delivered in accordance with existing agreements, but there would be no new storage and delivery mechanisms.</td></tr>
<tr><td></td><td>Shortage Guidelines to Reduce Deliveries from Lake Mead[3]</td><td>Coordinated Reservoir Operations (Lake Powell and Lake Mead)</td><td>Storage and Delivery of Conserved System and Non-system Water[3]</td><td>Surplus Guidelines to Increase Deliveries/ Releases from Lake Mead[3]</td><td>Additional Activities Above Lake Powell</td></tr>
<tr><td></td><td>• Shortages determined based on Lake Mead elevation
• Shortage volume of 400, 500, and 600 kaf at elevations 1,075, 1,050, and 1,025 feet, respectively
• Shortages distributed based on priority</td><td>• Lake Powell release of 8.23 maf unless more is required for equalization releases
• Releases less than 8.23 maf below elevation 3,490 feet due to Glen Canyon Dam infrastructure limitations</td><td>• No new storage and delivery mechanism to replace ICS
• Delivery of existing ICS in accordance with existing agreements</td><td>• Surplus determinations limited to 70R (spill avoidance strategy) and Flood Control conditions</td><td>• No specific additional activities above Lake Powell defined</td></tr>
</table>

[1] Article II(2) of the LROC states the "objective shall be to maintain a minimum release of water from Lake Powell of 8.23 [maf]." Reclamation recognizes that entities in the Basin have different legal positions regarding how this LROC statement incorporates other Law of the River elements to determine annual releases. Reclamation also recognizes that variation in releases of water above and below the minimum objective release of 8.23 maf can, in appropriate circumstances, be adopted.

[2] Releases from Glen Canyon Dam may be unable to achieve the specified annual release volume when Lake Powell is below elevation 3,490 feet due to infrastructure constraints. Modeling assumptions for all alternatives reflect this constraint (see **Appendix A**).

[3] These operational elements contain modeling assumptions for water deliveries to Mexico. Shortage volumes include assumptions related to reductions in water deliveries to Mexico. Lake Mead storage volumes for the Storage and Delivery of Conserved System and Non-system Water include assumptions related to storage available to Mexico. Surplus Guidelines include assumptions related to increased deliveries to Mexico. **Appendix A** provides additional detail. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

<table>
<tr><td>Basic Coordination Alternative</td><td colspan="5">This alternative is designed to be implementable absent new agreements among Basin water users. Lake Powell releases would primarily be 8.23 maf, with some releases above and below 8.23 maf, and minimum releases of 7.0 maf. Lake Powell elevations could be increased by releases from CRSP Upper Initial Units within their respective RODs to protect infrastructure at Glen Canyon Dam. Reclamation would identify triggers for when additional Upper Basin actions are needed to protect critical infrastructure. Lower Basin shortages up to 1.48 maf would be triggered based on Lake Mead elevation and distributed consistent with priority system. Existing ICS would be delivered in accordance with existing agreements, but there would be no new delivery and storage mechanisms.</td></tr>
<tr><td></td><td>Shortage Guidelines to Reduce Deliveries from Lake Mead[3]</td><td>Coordinated Reservoir Operations (Lake Powell and Lake Mead)</td><td>Storage and Delivery of Conserved System and Non-system Water[3]</td><td>Surplus Guidelines to Increase Deliveries/ Releases from Lake Mead[3]</td><td>Additional Activities Above Lake Powell</td></tr>
<tr><td></td><td>• Shortages based on Lake Mead elevation up to 1.48 maf
• Shortages distributed based on priority
• Identify conditions when additional reductions may be needed to avoid reaching critically low elevations</td><td>• Lake Powell releases are determined based on Lake Powell elevation unless equalization releases are required
• Releases range from 9.5 to 7.0 maf, unless more is required for equalization releases
• Identify conditions when additional action may be needed for infrastructure protection</td><td>• No new storage and delivery mechanism to replace ICS
• Delivery of existing ICS in accordance with existing agreements</td><td>• Surplus determinations limited to 70R (spill avoidance strategy) and Flood Control conditions</td><td>• Releases from CRSP Upper Initial Units within their respective RODs and contingent on hydrologic conditions to protect infrastructure at Glen Canyon Dam
• Identify conditions when additional Upper Basin actions may be needed for infrastructure protection</td></tr>
</table>

[3] These operational elements contain modeling assumptions for water deliveries to Mexico. Shortage volumes include assumptions related to reductions in water deliveries to Mexico. Lake Mead storage volumes for the Storage and Delivery of Conserved System and Non-system Water include assumptions related to storage available to Mexico. Surplus Guidelines include assumptions related to increased deliveries to Mexico. **Appendix A** provides additional detail. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

Enhanced Coordination Alternative

This alternative is based on concepts from Basin Tribes, federal agencies, and other stakeholders to achieve protection of critical infrastructure while benefitting key resources (e.g., natural, hydropower and recreation) through an approach to distributing storage between Lake Powell and Lake Mead. Lake Powell releases would be determined based on a combination of Lake Powell and Lake Mead elevations, 10-year running-average hydrology, and Lower Basin deliveries. This alternative would include storage and delivery mechanisms for Lake Powell and Lake Mead and extensive flexibilities for all users. The operations incorporate Basin-wide shared contributions to the system, including Upper Basin conservation that would be stored in Lake Powell and Lower Basin shortages starting at 1.3 maf, approximately the average annual evaporative and system losses at and below Lake Mead, and reaching a maximum of 3.0 maf. Shortages would be triggered based on combined storage in Lake Powell and Lake Mead and distributed pro rata.

Shortage Guidelines to Reduce Deliveries from Lake Mead[3]	**Coordinated Reservoir Operations (Lake Powell and Lake Mead)**	**Storage and Delivery of Conserved System and Non-system Water[3]**	**Surplus Guidelines to Increase Deliveries/ Releases from Lake Mead[3]**	**Additional Activities Above Lake Powell**
• Shortages determined based on combined storage in Lake Powell and Lake Mead • Shortages begin at 60% full at a volume of 1.3 maf, then increase linearly, reaching a maximum of 3.0 maf at 30% full and below • Shortages distributed pro rata	• Lake Powell releases determined based on a combination of Lake Powell and Lake Mead elevations, 10-year running-average hydrology, and Lower Basin deliveries • Releases range from 10.8 to 4.7 maf	• Storage up to 5.0 maf in Lake Mead with additional 2.0 maf Protection Pool; included for purposes of determining Lake Powell releases and shortages • Storage up to 2.0 maf in Lake Powell; included for purposes of determining Lake Powell releases but excluded from shortage determinations • Existing ICS converted to new mechanism immediately • Extensive flexibilities for all users: intra- and interstate transactions within each basin • Tribal water (both conserved consumptive use and unused) including in Lake Powell conservation pool and Lake Mead Protection Pool	• Surplus determinations limited to 70R (spill avoidance strategy) and Flood Control conditions	• Upper Basin conservation contributed to the Lake Powell conservation pool based on hydrologic conditions: up to 200 kaf per year for first 5 years, up to 275 kaf per year for second 5 years, up to 350 kaf starting in year 11

[3] These operational elements contain modeling assumptions for water deliveries to Mexico. Shortage volumes include assumptions related to reductions in water deliveries to Mexico. Lake Mead storage volumes for the Storage and Delivery of Conserved System and Non-system Water include assumptions related to storage available to Mexico. Surplus Guidelines include assumptions related to increased deliveries to Mexico. **Appendix A** provides additional detail. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

<table>
<tr><td>Maximum Operational Flexibility Alternative</td><td colspan="5">This alternative is informed by a proposal submitted by a consortium of conservation organizations and incorporates proactive responses, targeted reservoir management strategies, and innovative and flexible tools to address an increasingly variable set of future hydrologic conditions. Lake Powell releases would range from 11.0 maf to 5.0 maf and would be determined by total CRSP system storage and recent hydrology. Releases would switch to “run-of-river” when Lake Powell is at 3,510 feet or lower. The operations incorporate Basin-wide shared contributions, including up to 4.0 maf of shortages in the Lower Basin triggered by combined seven-reservoir storage (CRSP Units, Lake Mead, Lake Mohave, and Lake Havasu) and recent hydrology and voluntary water contributions from both basins.</td></tr>
<tr><td></td><td>Shortage Guidelines to Reduce Deliveries from Lake Mead[3]</td><td>Coordinated Reservoir Operations (Lake Powell and Lake Mead)[3]</td><td>Storage and Delivery of Conserved System and Non-system Water</td><td>Surplus Guidelines to Increase Deliveries/ Releases from Lake Mead[3]</td><td>Additional Activities Above Lake Powell</td></tr>
<tr><td></td><td>• Shortages determined based on combined seven-reservoir storage and recent hydrology
• Shortages start at 80% full and increase linearly, subject to upward adjustment based on hydrology, reaching a maximum of 4.0 maf
• Shortages distributed based on priority, as described in Approach 1 of the Supply Driven Alternative</td><td>• Lake Powell releases determined based on total Upper Basin system storage and recent hydrology
• Releases subject to downward adjustment based on hydrology and range from 11.0 to 5.0 maf
• Releases switch to “run-of-river” when Lake Powell is at elevation 3,510 feet or lower</td><td>• Storage up to 8.0 maf in either Lake Powell or Lake Mead; excluded for purposes of determining Lake Powell releases and shortages
• Existing ICS converted to new mechanism over 5 years
• Extensive flexibilities for all users: transactions within and across basins, including interstate and inter-basin</td><td>• Surplus determinations limited to Flood Control conditions</td><td>• Average of 200 kaf of Upper Basin annual conservation based on hydrologic conditions contributed to the Lake Powell conservation pool</td></tr>
</table>

[3] These operational elements contain modeling assumptions for water deliveries to Mexico. Shortage volumes include assumptions related to reductions in water deliveries to Mexico. Lake Mead storage volumes for the Storage and Delivery of Conserved System and Non-system Water include assumptions related to storage available to Mexico. Surplus Guidelines include assumptions related to increased deliveries to Mexico. **Appendix A** provides additional detail. Reclamation’s modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

<table>
<tr><td>Supply Driven Alternative</td><td colspan="5">Annual Lake Powell releases are determined based on a 65 percent of 3-year-average natural flow at Lees Ferry. Lake Powell elevations could be increased by releases from CRSP Upper Initial Units within their respective RODs to protect infrastructure at Glen Canyon Dam. This alternative would include new delivery and storage mechanisms for Lake Powell and Lake Mead. Lower Basin shortages up to 2.1 maf would be triggered based on Lake Mead elevation. This alternative analyzes two approaches to shortage distribution: state-based combined with Lower Basin-wide priority and state-based combined with Lower Basin-wide pro rata.</td></tr>
<tr><td></td><td>Shortage Guidelines to Reduce Deliveries from Lake Mead[3]</td><td>Coordinated Reservoir Operations (Lake Powell and Lake Mead)</td><td>Storage and Delivery of Conserved System and Non-system Water[3]</td><td>Surplus Guidelines to Increase Deliveries/Releases from Lake Mead[3]</td><td>Additional Activities Above Lake Powell</td></tr>
<tr><td></td><td>• Shortages determined based on Lake Mead elevation
• Shortages start at 1,145 feet and reach a maximum of 2.1 maf at 1,000 feet and below</td><td>• Lake Powell releases determined primarily based on 65% of 3-year natural flows at Lees Ferry
• Releases range from 12.0 to 4.7 maf</td><td>• Storage up to 8.0 maf in Lake Mead; excluded for purposes of determining shortages
• Storage up to 3.0 maf at Lake Powell; included for purposes of determining Lake Powell releases
• Existing ICS converted to new mechanism over 10 years
• Expanded flexibilities: interstate exchanges within each basin</td><td>• Surplus determinations based on Lake Mead elevation at or above 1,165 feet, 70R (spill avoidance strategy) or Flood Control conditions</td><td>• Increased releases from CRSP Upper Initial Units by up to 500 kaf per year within their respective RODs and contingent on hydrologic conditions to protect infrastructure at Glen Canyon Dam
• Up to 200 kaf of Upper Basin annual conservation based on hydrologic conditions contributed to the Lake Powell conservation pool
• In years when Lake Powell cannot meet its required water year release because of low elevation, additional “gap water” is introduced into the system and tracked to be released in subsequent years</td></tr>
</table>

[3] These operational elements contain modeling assumptions for water deliveries to Mexico. Shortage volumes include assumptions related to reductions in water deliveries to Mexico. Lake Mead storage volumes for the Storage and Delivery of Conserved System and Non-system Water include assumptions related to storage available to Mexico. Surplus Guidelines include assumptions related to increased deliveries to Mexico. **Appendix A** provides additional detail. Reclamation’s modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.