

Chapter 2. Description of Alternatives

The alternatives analyzed in this Final EIS include a broad range of operational elements incorporating over 4 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 long-term consensus-based approach to Basin reservoir operations has not yet been achieved.

In the absence of a long-term consensus-based approach, Reclamation has developed a Preferred Alternative and analyzed it in this Final EIS. As described in **Section 2.4**, the Preferred Alternative is a 10-year decision framework. The decision framework does not establish specific reservoir operating guidelines; rather, it provides the structure within which operating guidelines would be developed, reviewed, and periodically updated through 2036.

The decision framework in the Preferred Alternative offers a vehicle for continued work toward sustainable water management in the Basin. It provides continuity following the expiration of the 2007 Interim Guidelines; establishes transparency and predictability for future decision making; preserves flexibility to respond to changing hydrology and evolving Basin circumstances; facilitates incorporation of future Basin consensus recommendations; and is consistent with applicable federal law.

This chapter summarizes the alternatives development process, describes the Preferred Alternative, provides a summary of all other alternatives analyzed in this Final EIS, and summarizes the performance tradeoffs between alternatives. Additional detail on these alternatives, including those considered but eliminated from detailed analysis is provided in **Appendix S**, Additional Description of Alternatives.

2.1 Development of Alternatives

The goal of the alternatives development phase for this Final EIS was to develop a reasonable and broad range of alternatives for managing the Colorado River system and its resources. 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 four operational elements that are the basis for operating guidelines that may eventually be developed under the Preferred Alternative

The process of developing the range of alternatives was informed by solicitation of input and extensive collaborative engagement with stakeholders throughout the Basin. This took place over a two-and-a-half-year period beginning with publication of the Scoping Report in October 2023 (as

described in **Section 1.5**) through publication of this Final EIS. To facilitate public input on and understanding of the alternatives, from December 2023 through March 2026 Reclamation supported access to the Post-2026 Operations Exploration Web Tool. This Web Tool was an online platform developed to allow 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 was 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 rest of the alternatives development process, Reclamation received considerable [input](#) from the Basin States, many Basin Tribes, 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 met continuously 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 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 2024¹ and publishing an [Alternatives Report](#) (Reclamation 2025a) documenting the preliminary alternatives as of January 2025. On January 9, 2026, the EPA published a notice in the *Federal Register* ([91 Federal Register 2131](#)) announcing the availability of the Draft EIS and beginning a public comment period that ran through March 2, 2026. The Draft EIS analyzed five alternatives to capture a broad range of operational concepts and potential environmental impacts:

- No Action Alternative (discussed in **Section S.1**)
- Basic Coordination Alternative (discussed in **Section S.2**)
- Enhanced Coordination Alternative (discussed in **Section S.3**)
- Maximum Operational Flexibility Alternative (discussed in **Section S.4**)
- Supply Driven Alternative (discussed in **Section S.5**)

As discussed in more detail in **Section 2.4**, this Final EIS contains an additional alternative that the Department has identified as the Preferred Alternative.

The alternatives analyzed in the Draft EIS were informed by input from the Basin States, Basin Tribes, and other stakeholders referenced above, though they do not include all proposals submitted as standalone alternatives. Prior to the publication of the Draft EIS, Reclamation performed preliminary modeling of the initial (March 2024) and revised (December 2024 and January 2025) proposals submitted separately by the Upper Division States and Lower Division States and concluded that each lacked an appropriate basis for the comprehensive and coordinated operations of Lake Powell and Lake Mead. After continued work with all seven states throughout the spring and summer of 2025, the concept that became the Supply Driven Alternative was actively being considered by all states but had

¹ Webinar presentation material is available here: https://www.usbr.gov/ColoradoRiverBasin/documents/post2026/P26_Public_Status_Update_Webinar_10-10-24_508.pdf.

not achieved full agreement. Because there was no consensus-based alternative, the Draft EIS attempted to capture the state of discussions through inclusion of the Supply Driven Alternative but did not identify a preferred alternative. After publication of the Draft EIS, coordination with the States continued although the discussion had moved away from the concept of the Supply-Driven Alternative.

In addition to the individual state comments submitted on the Draft EIS that contained proposed operational strategies, the Upper Division States and Lower Division States submitted additional proposals in May 2026 after the publication of the Draft EIS. The proposal submitted by the Lower Division States described a 2-year set of operating guidelines through 2028 as a bridge to allow future opportunity to reach a consensus-based long-term solution. The Preferred Alternative identified in this Final EIS incorporates concepts from the States' proposals and tribal input and leaves open the opportunity for Basin entities to subsequently arrive at a consensus-based path forward. Should no consensus emerge, the Preferred Alternative ensures that the Secretary will have the flexibility to make necessary operational decisions.

2.2 The Four Operational Elements Included in Each Alternative

In consideration of the input received during pre-scoping and scoping, and to meet the purpose and need described in **Section 1.3**, Reclamation identified four operational elements that make up each alternative described below.² 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 2.5**, 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 on 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 U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. 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.

2.2.1 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

² 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.

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 future 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 (including priority-based and other approaches), 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 on hydrologic and other environmental resources. These modeling assumptions are identical under all alternatives.³

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 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 Powell and Lake Mead, pursuant to applicable 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

³ Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico.

large, inclusive pools that may be flexibly stored in either reservoir to maximize their benefit to the system.

While delivery of existing ICS is available after 2026 pursuant to existing and any new agreements, Reclamation may establish guidelines for administration of a new ICS program and/or storage mechanisms, including 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 releases from the CRSP Upper Initial Units⁴ within their respective RODs to increase elevations at Lake Powell 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 on 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.⁵ Since the late 1990s, management of the river has historically been based on Secretarial authority along with tools that are founded on agreements among Basin water users (e.g., interstate water banking, ICS and forbearance, etc.). In most cases, Reclamation's authority has been sufficient to fully implement the agreements. In contrast, however, specific operational mechanisms negotiated as part of the 2019 DCP required congressional legislation⁶ to fully implement.

The alternatives in this Final 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.

⁴ Flaming Gorge, Blue Mesa (the most upstream facility of the Aspinall Unit, which serves as its primary storage reservoir), and Navajo reservoirs.

⁵ This Final EIS analyzes potential operations to improve coordinated operations under dry hydrology that are designed to reduce the need for emergency operations. However, the need to perform emergency or other necessary operations remains, and the Department reserves its authorities to perform such operations, which could include operation of UIUs outside of RODs, reduction of Glen Canyon Dam releases, and greater Lower Basin shortages. Specific emergency, or other necessary operations, are not proposed in this document because the conditions around such potential operations are too speculative at this time. If such conditions arise, operational decisions and notifications would be made at that time based on the then-current conditions with appropriate levels of analysis.

⁶ The Colorado River Drought Contingency Authorization Act was passed on April 16, 2019, directing the Secretary to implement the 2019 DCP.

2.4 Preferred Alternative

The Preferred Alternative is a 10-year decision framework through 2036. The decision framework establishes operational principles, sideboards (key thresholds and ranges for operational elements), and a process that would govern development and issuance of operating guidelines covering anticipated 2-year intervals, unless consensus-based agreements provide for a longer duration. The framework does not establish specific operating guidelines; rather, it provides the structure within which operating guidelines would be developed, reviewed, and periodically updated. The framework (principles, sideboards, and process) would remain constant through 2036, unless modified through future federal action and appropriate environmental compliance.

The choice of a 10-year period in the Preferred Alternative is a duration contemplated in the Draft EIS but shorter than the duration of recent operating guidelines. In 2023, the Proposed Federal Action contemplated adopting successor operating guidelines for approximately 20 years, which was identified as an appropriate length of time to gain operational experience and reflected the expectation that the Basin would reach consensus on a long-term operational approach. At the time the Draft EIS was published, that outcome was still being pursued. In the absence of such consensus, and given the uncertainty facing the Basin, the Department has determined that rather than imposing prescribed operating guidelines that would be in place for 20 years, a different approach was needed. Thus, the Department selected a 10-year decision framework that provides certainty regarding the decision process while preserving flexibility to adapt to changing conditions. A 10-year duration also provides sufficient time to gain operational experience, thereby informing future operational and water management decisions.

As of the date of this Final EIS, it is anticipated that the first operating interval would cover 2027–2028. Reclamation worked extensively with stakeholders to develop guidelines that align with the operational principles and sideboards. For the purpose of describing the potential upcoming operating guidelines and their associated impacts, a preliminary description and analysis of those anticipated operating guidelines is included in **Appendix T**.

2.4.1 Rationale for Selecting the Preferred Alternative

Since 2021, Colorado River operations have included a series of extraordinary operations designed to bolster reservoir elevations and protect the ability of infrastructure at Glen Canyon Dam to continue reliable operations in response to extremely low hydrologic conditions. Despite all of these measures, and compounded by uncertain future hydrologic conditions, the risk to the system has never been greater. The prevalence of extraordinary activities and the state of the system demonstrate the great need for flexibility and adaptation. At the same time, structure and transparency are needed to provide predictability for Basin stakeholders.

Consensus-based approaches have provided stability for the system for decades, including when extraordinary measures have been needed. The Department and Reclamation engaged extensively with the Basin States, Basin Tribes, and other interested parties in pursuit of developing consensus-based long-term operational guidelines. Unfortunately, as of the publication of this Final EIS, consensus on long-term operations has not been reached. Basin entities continue to work toward consensus and, given how important consensus-based agreements have been in the Basin, the Department is

committed to preserving the opportunity to implement potential future consensus agreements within the Preferred Alternative. Should no consensus emerge, the Preferred Alternative ensures that the Secretary will have the flexibility to make necessary operational decisions.

The Preferred Alternative strikes a balance between flexibility and predictability given unprecedented hydrologic and system conditions and the potential for considerable impacts on water users. It is a reasonable approach to meeting the purpose and need described in **Section 1.3**. Analysis of the operational sideboards in **Section 2.6** demonstrates that, while there are inherent performance tradeoffs among resources that benefit from different fundamental system elements—storage in each reservoir, dam releases, river flows, and water deliveries—the Preferred Alternative, as analyzed in the Representative Preferred Alternative (described in **Section 2.4.3**), appropriately balances the tradeoffs and achieves more robust performance than previous operations.

The decision framework establishes a transparent and structured process guided by operational principles that allows Reclamation and stakeholders to adapt and respond to uncertain future conditions and extremely low reservoir elevations. This flexibility allows for the recognition of evolving Basin circumstances and for more robust performance through development of innovative and adaptive operational mechanisms.

2.4.2 Operating Guidelines, Operational Principles, Operational Sideboards, and Process

2.4.2.1 Operating Guidelines

Operating guidelines are the objective criteria that determine the operations of Lake Powell and Lake Mead for the anticipated 2-year interval. For each interval, the framework process would be carried out to develop and issue operating guidelines in accordance with the principles and sideboards described below. The operating guidelines would be adopted through the issuance of a decision document published in the *Federal Register*. Once issued, the operating guidelines would be implemented through Annual Operating Plans.

During the implementation of each set of guidelines, the process to develop subsequent guidelines would begin. Each set of operating guidelines would be informed by the operational principles, consider the performance of the previous operating guidelines, and incorporate additional agreements that may be reached during the duration of the decision framework, such as consensus agreements among states and other parties and/or tribal water rights settlements. Before the issuance of new operating guidelines, a review would be conducted to ensure that the potential impacts of such operating guidelines are within the range of impacts analyzed in this NEPA process.

Throughout the period of the decision framework, it is the intent that the operating guidelines would implement the LROC by providing objective criteria for coordinated operations, while recognizing operations to respond to extraordinary circumstances due to hydrologic conditions may be warranted, consistent with applicable federal law.

As of the date of this Final EIS, the first set of operating guidelines are anticipated to be issued in July 2026 and are anticipated to cover 2027–2028.

2.4.2.2 Operational Principles

The decision framework's operational principles are fundamental objectives and considerations that reflect Reclamation's mandate to protect the Colorado River system infrastructure, acknowledge the Secretary's authority to operate the system and take protective actions when necessary, and promote reaching consensus operations whenever possible.

Elevating these principles ensures that operating guidelines adopted under the framework adhere to fundamental management priorities and provide a basis for review and reflection as new operating guidelines are developed.

The operational principles are listed below:

1. **Operations should be responsive to hydrology.** Annual operations and mid-year adjustments that account for evolving supply conditions should be adopted to ensure a flexible, adaptive approach to management.
2. **Critical federal infrastructure must be protected through practical and deliberate operations.** When Lake Powell is projected to fall below elevation 3,500 feet or when Lake Mead is projected to fall below elevation of 1,000 feet, processes and tools will be used to manage risks to infrastructure and prevent damage to federal facilities of regional and national importance. These elevations reflect current understanding of these facilities but do not preclude the identification of alternate or additional critical elevations.
3. **Operating guidelines should implement the LROC while also providing directions to address extraordinary circumstances.** Operating guidelines will provide objective criteria for operating under low reservoir conditions within the bounds of the LROC but may also provide for temporary operational actions that are not otherwise provided for under the LROC when necessary to protect critical federal infrastructure in accordance with applicable federal law.
4. **Operating guidelines should prioritize consensus-based recommendations.** The Department will support efforts to achieve consensus agreements that appropriately provide benefits to multiple parties, that offer innovative, inclusive solutions to operational and management challenges, and that are sufficiently protective of the system. Should such agreements arise, they will be prioritized as new operating guidelines are developed and adopted. In the absence of consensus-based arrangements, the Secretary will take necessary management actions, consistent with applicable federal law.

2.4.2.3 Operational Sideboards

The decision framework's operational sideboards are key thresholds and ranges for operational elements that create boundaries for the development of each set of operating guidelines and provide a basis for environmental compliance for the duration of the decision framework. The sideboards defined in **Table 2-1** were chosen to appropriately balance tradeoffs among resources and ensure that the Department would have the flexibility and environmental compliance to operate in accordance with the operational principles given future hydrologic uncertainty.

Table 2-1
Operational Sideboards for the Preferred Alternative

Operational Element	Operational Ranges
Lower Basin Shortage Guidelines	Up to 3.0 maf to provide protection of critical infrastructure at Hoover Dam in dry hydrologic conditions The allocation of shortages would be based on applicable law, including the Consolidated Decree. Deviation from applicable law would occur only if water entitlement holders have reached voluntary arrangements Consultation would occur if projected Lake Mead elevation < 1,000 ft to determine potential additional reductions to Lower Basin water deliveries
Coordinated Reservoir Operations	5.0 maf to 12.0 maf Lake Powell WY releases to provide protection for critical infrastructure at Glen Canyon Dam and sufficiently high releases necessary to prevent spill avoidance releases Consultation would occur if projected Lake Powell elevation < 3,500 ft to determine potential additional actions
Storage and Delivery of Conserved System and Non-system Water	Lake Powell: up to 3.0 maf Lake Mead: up to 8.0 maf (supports existing ICS, new ICS-type program, conservation pools, and exchange mechanisms)
Lower Basin Surplus Guidelines	Up to 500.0 kaf in addition to Flood Control and Quantified Surplus
Additional Activities Above Lake Powell	Potential for maximum use of CRSP Upper Initial Units within their respective RODs to release additional water if needed to protect critical infrastructure Voluntary Upper Basin contributions up to 200.0 kaf per year subject to hydrologic conditions

2.4.2.4 Process

Each set of operating guidelines would be implemented and evaluated through a process during which Reclamation would work with stakeholders to seek consensus, align with operational principles and sideboards, and account for system conditions, hydrology, and other Basin developments. This process is illustrated through an example schedule of activities and determinations during the potential 2027–2028 operating guidelines interval outlined in **Table 2-2**. Two years are anticipated to be appropriate due to the current drier hydrological conditions and low reservoir elevations of the system.

Table 2-2
Example Operating Guidelines Process, 2026-2028

Month and Year	Reclamation Actions or Activities by Water Year (WY)
July 2026	Anticipated issuance of Operating Guidelines pursuant to ROD
August 2026	Implement WY 1 operations through AOP
August 2027	Implement WY 2 operations through AOP

Month and Year	Reclamation Actions or Activities by Water Year (WY)
October 2027	Review current Operating Guidelines and develop considerations for the next set of Operating Guidelines
November 2027	Release review and considerations for the next set of Operating Guidelines
November 2027 – March 2028	- Engage and consult with stakeholders regarding the next set of Operating Guidelines - Develop preliminary proposed Operating Guidelines, applying operational principles and sideboards
March 2028	Release preliminary Operating Guidelines
May 2028	Consensus recommendations on Operating Guidelines due
May – June 2028	Finalize Operating Guidelines, perform analysis and necessary consultations
June 2028	- Release upcoming Operating Guidelines - Initial AOP consultation on next WY's operations (per upcoming Operating Guidelines)
July 2028	- Conduct compliance checks on upcoming Operating Guidelines - Issue Federal Register Notice with Operating Guidelines
August 2028	Implement WY 3 operations through AOP

Subsequent periods would follow the same process of implementing, reviewing, engaging, and issuing new operating guidelines.

2.4.3 Representation of the Four Operational Elements

In contrast to the specified operations under the other alternatives in this chapter, the Preferred Alternative is designed to create the opportunity for subsequent decision making; because of this distinction, it is appropriate to include a modeling representation of operating guidelines that may be developed under the Preferred Alternative. The sideboards provide a basis for understanding the range of potential impacts, and analyzing these potential impacts provides a necessary and instructive comparison to the other alternatives included in this Final EIS. Taken together, the representation of the operational elements described below is referred to and analyzed in this Final EIS as the “Representative Preferred Alternative.” The Representative Preferred Alternative is a set of modeling assumptions designed around the Preferred Alternative sideboards to approximate the range of operating guidelines that may be adopted for each interval during the 10-year framework. The specifications in the operational elements below reflect how the Representative Preferred Alternative was modeled; exact operations would be subject to the guidelines in place during each interval and would adhere to consultation triggers as described in **Table 2-1**. The modeling assumptions do not represent implementation details (e.g., use of projections) that would be identified as specific operating guidelines are developed through the decision framework process.

Modeling in this Final EIS that captures the sideboards, and the analysis of the potential impacts, provides environmental compliance for decisions made consistent with the decision framework.

2.4.3.1 Guidelines to Reduce or Increase Deliveries from Lake Mead

2.4.3.1.1 Shortage Conditions

This alternative models shortages of up to 3.6 maf (including assumptions about reductions to Mexico) and two different approaches to distributing shortages are applied. Two different approaches for distributing shortage are modeled in order to analyze the impacts of the proposal received on May 1, 2026, from the Lower Division States regarding the distribution of shortage in 2027 and 2028.

In 2027 and 2028 shortage volumes up to 1.5 maf are distributed using the approach developed by the Lower Division States and shortage volumes above 1.5 maf up to 3.6 maf are distributed using the priority system.⁷ In 2029 through 2060, all volumes of shortage are distributed using the priority system. **Table 2-3** and **Table 2-4** show how shortage volumes are divided among the states and Mexico for each time period.

The shortage guidelines are summarized below and shown in **Figure 2-1**.

Table 2-3
2027–2028 Shortage Distribution,
Representative Preferred Alternative

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 2,344 kaf	Shortage (%) 2,345 kaf to 3,600 kaf
Arizona	80.00	43.33	760	76.26	31.10
California	0	36.67	440	0	45.16
Nevada	3.33	3.33	50	7.08	7.08
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 U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. 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.

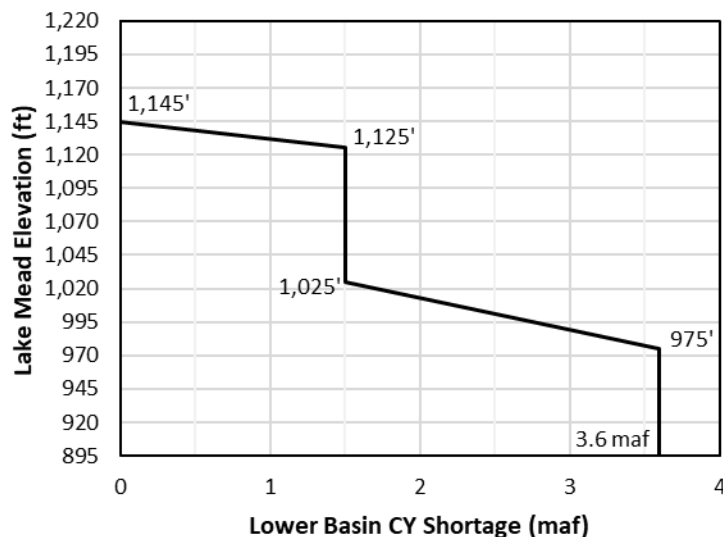
⁷ As noted in **Section 2.4**, the anticipated guidelines for the first operating interval as of publication of this Final EIS are preliminary. Modeling assumptions for 2027–2028 regarding shortage distribution reflect the May 1, 2026, Lower Division States proposal. As described in **Table 2-1**, Operational Sideboards for the Preferred Alternative, absent voluntary arrangements, the distribution of shortages would be based on applicable law (i.e., the priority system). This distribution is modeled in the Representative Preferred Alternative for years 2029 and beyond. Both distribution methods are documented and analyzed in **Appendix C**, Shortage Allocation Model, and **Chapter 3**. Regarding maximum shortage volume, modeling assumptions provide for reductions above the 1.25 maf maximum if needed to avoid critically low elevations at Lake Mead.

Table 2-4
2029-2060 Shortage Distribution,
Representative Preferred Alternative

Entity	Shortage (%) from 0 to 1,814 kaf	Shortage (%) from 1,815 to 3,600 kaf
Arizona	77.40	25.77
California	0	51.63
Nevada	5.93	5.93
Mexico	16.67	16.67
Total	100	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 U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. 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.

Figure 2-1
Shortage Guidelines to Reduce Deliveries from Lake Mead,
Representative Preferred 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 U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. 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.

2.4.3.1.2 Surplus Conditions

Volumes above normal apportionment are distributed when criteria are met in Lake Mead for a Domestic Surplus Condition, a 70R Surplus Condition or a Flood Control Surplus Condition.^{8, 9} A Domestic Surplus is determined anytime the January 1 Lake Mead pool elevation is at or above 1,165 feet and Flood Control or 70R Surplus is not triggered. Depending on Lake Mead's physical pool elevation, up to 500.0 kaf of Domestic Surplus volume is distributed.

2.4.3.2 Coordinated Reservoir Operations (Lake Powell and Lake Mead)

The WY release volume from Lake Powell determined on October 1 ranges from 6.0 maf to 12.0 maf. If Lake Powell is projected to decline below elevation 3,500 feet, the WY release volume is reduced to as low as 5.0 maf to protect critical elevations at Lake Powell.

2.4.3.2.1 Primary Operations

WY releases from Lake Powell would be based on the observed October 1 elevation¹⁰ as depicted in **Figure 2-2**.

2.4.3.2.2 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 would release a minimum of 12.0 maf and may release more to balance storage with Lake Mead (see **Appendix A**, CRSS Model Documentation, for details).

2.4.3.2.3 Infrastructure Protection and Other Considerations

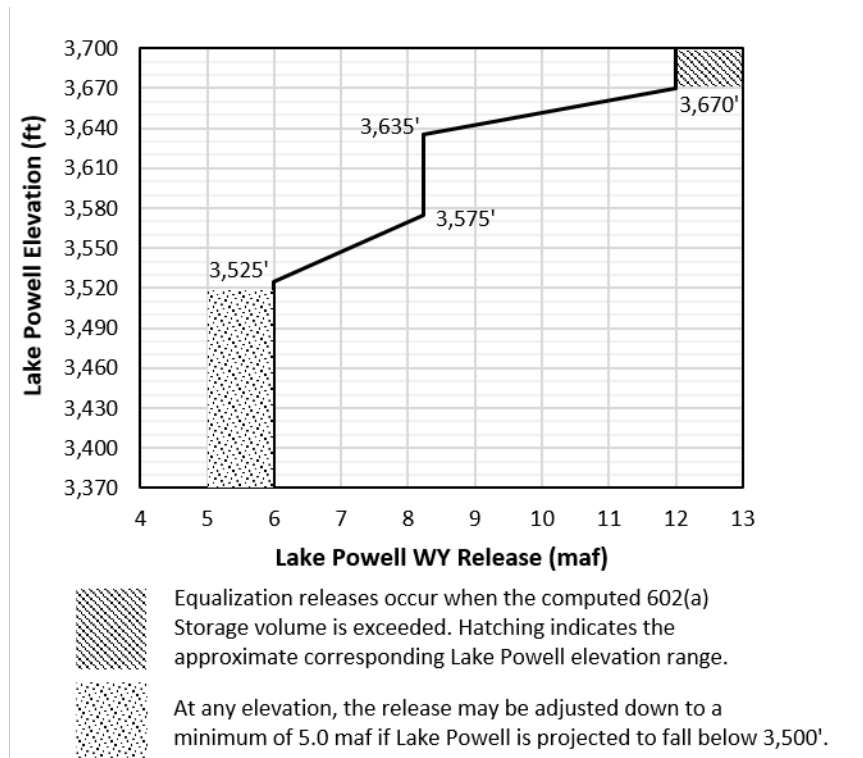
If Lake Powell is projected to fall below 3,500 feet within the WY, the WY release is reduced to prevent this from occurring, subject to a minimum WY release of 5.0 maf.

⁸ 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.

⁹ If flood control releases are anticipated to be required given the current inflow forecast, the Secretary declares Flood Control Surplus conditions for that year.

¹⁰ While a mid-year adjustment is included in the operational principles for the Preferred Alternative, it was not incorporated into the Representative Preferred Alternative modeling assumptions when they were finalized due to then-ongoing discussions about how such a mechanism should be used to adjust Lake Powell's WY release. The modeling of the Representative Preferred Alternative is still a reasonable representation of the operational principles and sideboards. Although the mid-year adjustment can shift the timing of release volumes, modestly increasing or decreasing a given WY release with a likely corresponding adjustment in the opposite direction the following year, it would not change the range of WY releases across the analysis, which would remain within the sideboards of 5.0 to 12.0 maf.

Figure 2-2
Coordinated Operations of Lake Powell and Lake Mead,
Representative Preferred Alternative



2.4.3.3 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 consumptively used tribal water, which may require additional authorities.

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 Federally Managed Water Resources Pool, which was informed by a group of Basin Tribes and would be established by Reclamation for Lower Basin-wide benefits. The design of these mechanisms supports proactive conservation and water user flexibility.

2.4.3.3.1 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 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 conserved consumptive use stored in the pool. Water in the Lake Powell conservation pool can be released if needed to meet the determined WY volume. Assumptions related to contributions to the Lake Powell conservation pool are described in **Section 2.4.3.4.1**.

2.4.3.3.2 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 7.0 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 2-5**. All conserved water stored in Lake Mead would be included in determinations of equalization releases from Lake Powell and Lower Basin surplus 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 2-5
Volume Limitations of Storage and Delivery of Conserved Water,
Representative Preferred Alternative

Entity	Maximum Annual Contribution (kaf)	Maximum Cumulative Storage (kaf)	Maximum Annual Conversion or Delivery ² (kaf)
Arizona	880	2,300	430
California	880	2,300	430
Nevada	100	900	140
Mexico ¹	500	1,500	200 ³
Total	2,360	7,000	1,200

- 1) 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 U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. 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) The Representative Preferred Alternative maintained the total U.S. annual delivery of 1.0 maf from the 2007 Interim Guidelines. For modeling purposes, to maximize reach impacts, and to integrate with other modeling assumptions, e.g., demand schedules, the state specific maximums were modified from those in the 2007 Interim Guidelines; this modeling assumption is not intended to determine any future state maximum delivery constraints.
- 3) The 1944 Water Treaty authorizes scheduled delivery of up to 200.0 kaf in excess of the 1.5 annual allotment to Mexico.

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 three percent system assessment would be applied, along with a one-time seven percent assessment allocated to the Federally Managed Water Resources Pool, for a total assessment of 10 percent.

Conversion and delivery of conserved water would be prohibited when Lake Mead begins the year with a physical pool elevation below 1,000 feet and would be limited to 50 percent of the maximum annual delivery/conversion volume when Lake Mead begins the year with a physical pool elevation between 1,000 and 1,025 feet. Additionally, when Lake Mead begins the year with a physical pool elevation above 1,125 feet, delivery and conversion of stored water would not be subject to a state's annual apportionment or Mexico's annual allotment.

2.4.3.3.3 Lake Mead Mechanism (Federally Managed Water Resources Pool)

The Federally Managed Water Resources Pool is a pool of water in Lake Mead established by Reclamation that is anticipated to be around 450.0 kaf, but could reach a maximum volume of 1.0 maf¹¹. It could acquire water through multiple mechanisms involving acquisition of conserved consumptive use water including but not limited to ICS. Contents of the Pool would be included in determinations of Lake Powell equalization releases and Lower Basin surplus and shortage volumes.

Depending on final formulation, the Pool could be used for a range of purposes, including meeting federal firming or other federal delivery obligations pursuant to Congressionally authorized Indian water rights settlements¹² and providing limited offsetting of tribal water shortages as well as protecting federal infrastructure. Modeling assumptions related to logic for creation and use of Pool volumes can be found in **Appendix B**, Modeling Assumptions: Lake Powell and Lake Mead Storage and Delivery of Conserved Water. Delivery of water from the Pool would be prohibited when Lake Mead's elevation is below 1,000 feet. Additionally, annual contribution and delivery/conversion constraints could be outside the limits outlined in **Section 2.4.3.3.2**.

2.4.3.3.4 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 transferred to the Post-2026 Lake Mead water user-controlled mechanism immediately and would be subject to all provisions described in the previous section.

2.4.3.4 Additional Activities Above Lake Powell

2.4.3.4.1 Upper Basin Conservation

Exact volumes of Upper Basin conservation over time are uncertain, but for the purposes of modeling, conservation up to a maximum volume of 200.0 kaf per year is included, with variable annual volumes based on hydrologic conditions. Conservation is modeled as a single lumped volume; no assumptions are made with respect to contributions from different entities or via specific activities.

2.4.3.4.2 Releases to Protect Glen Canyon Dam

This alternative would allow for potentially maximum use of the CRSP Upper Initial Units within their respective RODs to release additional water if needed to protect critical infrastructure at Glen Canyon Dam. Additionally, if Lake Powell's elevation is projected to go below 3,525 feet, CRSP Upper Initial Units would increase their releases within their RODs, 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 CRSP 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.

¹¹ This volume has been proposed to accommodate future water use arrangements, which could include but would not be limited to conservation programs, contracts, and potential Indian water rights settlements.

¹² 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, including under Section 105(a) of the Arizona Water Settlements Act of 2004, Pub. L. 108-451, 118 Stat. 3478.

2.5 Summary Comparison of Alternatives

Preferred Alternative (Including Representation of Operational Elements)	The Preferred Alternative is a multi-year decision framework that establishes the process and criteria that would govern development and adoption of operating guidelines through 2036. The decision framework is anticipated to be implemented in two-year operating intervals, unless consensus-based agreements provide for a longer duration. Unlike other alternatives, the operating guidelines for each interval are not specified in this Final EIS, and each set of guidelines would be developed based on operational principles and fit within the framework's defined operational sideboards (thresholds and ranges for operational elements). The sideboards provide a basis for assumptions included in the Representative Preferred Alternative summarized in this table, which captures the range of operating guidelines that may be adopted during each interval. Lake Powell releases range from 5.0 maf to 12.0 maf depending primarily on Lake Powell elevation. Lower Basin shortages up to 3.6 maf (including assumptions about reductions to Mexico) are distributed using a combination of LB Priority (up to 1.5 maf, 2027-2028) and priority.				
	Shortage Guidelines to Reduce Deliveries from Lake Mead ^{3, 4}	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 up to 3.6 maf (including assumptions about reductions to Mexico) - In 2027-2028, shortages up to 1.5 maf are distributed based on the distribution developed by the Lower Division States and shortages exceeding 1.5 maf are distributed based on priority (Approach 1 of the Supply Driven Alternative) - After 2028, shortages are distributed based on priority, unless agreements are reached - Consultation to determine additional reductions if projected Lake Mead elevation is less than 1,000 feet	- Lake Powell releases determined based on Lake Powell elevation unless equalization releases are required - Releases range from 5.0 to 12.0 maf, unless more is required for equalization releases - Consultation to determine additional actions if projected Lake Powell elevation is less than 3,500 feet	- Storage up to 7.0 maf in Lake Mead with additional 1.0 maf Federally Managed Water Resources Pool; included for purposes of determining Lower Basin surplus and Shortage Conditions, as well as equalization releases from Lake Powell - Storage up to 3.0 maf at Lake Powell; included for purposes of determining Lake Powell releases - Existing ICS converted to new mechanism immediately - Expanded flexibilities: interstate exchanges within each basin, new tribal mechanism	Surplus determinations based on Lake Mead elevation at or above 1,165 feet, 70R (spill avoidance strategy) or Flood Control conditions	- Potential maximum use of CRSP Upper Initial Units within their respective RODs to release additional water if needed to protect critical infrastructure at Glen Canyon Dam contingent on hydrologic conditions - Trigger additional releases when projected Lake Powell elevation is less than 3,525 feet - Voluntary Upper Basin contributions up to 200.0 kaf per year subject to hydrologic conditions

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 U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. 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 As noted in **Section 2.4**, the anticipated guidelines for the first operating interval as of publication of this Final EIS are preliminary. Modeling assumptions for 2027-2028 regarding shortage distribution reflect the May 1, 2026, Lower Division States proposal. As described in **Table 2-1**, Operational Sideboards, absent voluntary arrangements, the distribution of shortages would be based on applicable law (i.e., the priority system). This distribution is modeled in the Representative Preferred Alternative for years 2029 and beyond. Both distribution methods are documented and analyzed in **Appendix C**, Shortage Allocation Model, and **Chapter 3**. Regarding maximum shortage volume, modeling assumptions provide for reductions above the 1.25 maf maximum if needed to avoid critically low elevations at Lake Mead.

No Action Alternative	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 600.0 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.				
	Shortage Guidelines to Reduce Deliveries from Lake Mead³	Coordinated Reservoir Operations (Lake Powell and Lake Mead)	Storage and Delivery of Conserved System and Non-system Water³	Surplus Guidelines to Increase Deliveries/ Releases from Lake Mead³	Additional Activities Above Lake Powell
	- Shortages determined based on Lake Mead elevation - Shortage volume of 400.0, 500.0, and 600.0 kaf at elevations 1,075, 1,050, and 1,025 feet, respectively - Shortages distributed based on priority	- 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	- No new storage and delivery mechanism to replace ICS - Delivery of existing ICS in accordance with existing agreements	Surplus determinations limited to 70R (spill avoidance strategy) and Flood Control conditions	No specific additional activities above Lake Powell defined

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 U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. 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.

Basic Coordination Alternative	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.				
	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 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	- Lake Powell releases are determined based on Lake Powell elevation unless equalization releases are required - Releases range from 7.0 to 9.5 maf, unless more is required for equalization releases - Identify conditions when additional action may be needed for infrastructure protection	- No new storage and delivery mechanism to replace ICS - Delivery of existing ICS in accordance with existing agreements	Surplus determinations limited to 70R (spill avoidance strategy) and Flood Control conditions	- 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

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 U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. 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 Mead³	Coordinated Reservoir Operations (Lake Powell and Lake Mead)	Storage and Delivery of Conserved System and Non-system Water³	Surplus Guidelines to Increase Deliveries/ Releases from Lake Mead³	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 4.7 to 10.8 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 200.0 kaf per year for first 5 years, up to 275.0 kaf per year for second 5 years, up to 350.0 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 U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. 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.

Maximum Operational Flexibility Alternative	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 5.0 to 11.0 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 Upper Initial Units, Lake Mead, Lake Mohave, and Lake Havasu) and recent hydrology and voluntary water contributions from both basins.				
	Shortage Guidelines to Reduce Deliveries from Lake Mead³	Coordinated Reservoir Operations (Lake Powell and Lake Mead)³	Storage and Delivery of Conserved System and Non-system Water	Surplus Guidelines to Increase Deliveries/ Releases from Lake Mead³	Additional Activities Above Lake Powell
	• 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	• 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 5.0 to 11.0 maf • Releases switch to “run-of-river” when Lake Powell is at elevation 3,510 feet or lower	• 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	• Surplus determinations limited to Flood Control conditions	• Average of 200.0 kaf of Upper Basin annual conservation based on hydrologic conditions contributed to the Lake Powell conservation pool

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 U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. 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.

Supply Driven Alternative	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.				
	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 Lake Mead elevation - Shortages start at 1,145 feet and reach a maximum of 2.1 maf at 1,000 feet and below - Shortages distributed using two approaches: LB Priority and LB Pro Rata	- Lake Powell releases determined primarily based on 65% of 3-year natural flows at Lees Ferry - Releases range from 4.7 to 12.0 maf	- 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	Surplus determinations based on Lake Mead elevation at or above 1,165 feet, 70R (spill avoidance strategy) or Flood Control conditions	- Increased releases from CRSP Upper Initial Units by up to 500.0 kaf per year within their respective RODs and contingent on hydrologic conditions to protect infrastructure at Glen Canyon Dam - Up to 200.0 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

³These 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 U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. The U.S. 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.

2.6 Summary of Tradeoffs between Alternatives

Operations at Lake Powell and Lake Mead inherently involve tradeoffs among resources that benefit from different fundamental system elements: storage in each reservoir, dam releases, river flows, and water deliveries. For example, it is not possible for a set of operating guidelines to have the most robust performance with respect to maximizing protection of critical elevations, minimizing reductions in water deliveries, and maximizing hydropower generation all at once. With the extended period of dry hydrologic conditions since 2000 and the resulting depletion of storage, these tradeoffs have become more stark, and achieving a broadly acceptable balance between resources is now more difficult than ever before.

Based on the analysis in this Final EIS and the key tradeoffs shown below, the Preferred Alternative, as analyzed in the Representative Preferred Alternative, appropriately balances the inherent system tradeoffs: it is a practical approach to robust protection of critical infrastructure while considering adverse impacts to water users and avoiding unnecessary impacts to other resources.

2.6.1 Tradeoffs Analysis

While there are many important metrics across Basin resources, it is instructive to summarize the high-level system impacts through five metrics related to Lake Powell and Lake Mead elevations, Lower Basin deliveries, and releases from Glen Canyon Dam. Analyzing tradeoffs among the metrics described in **Table 2-6** also provides important insight into the tradeoffs among other resources.

Table 2-6
High Level Performance Metrics Included in Figure 2-3

Metric Name	Description
Percent of months in which Lake Powell stays above elevation 3,500 feet	Elevation 3,500 feet provides a buffer above 3,490 feet, below which the reliability of infrastructure to meet critical downstream water supply needs may be critically impacted and hydropower cannot be produced at Glen Canyon Dam
Percent of months in which Lake Mead stays above elevation 975 feet	Elevation 975 feet provides a buffer above 950 feet, below which infrastructure may be critically impacted and hydropower cannot be produced at Hoover Dam
Percent of years in which Lake Mead dead pool-related reductions ¹³ are avoided	Delivery reductions due to Lake Mead being near dead pool (elevation 895 feet) resulting in large magnitudes of reductions to Lower Basin water users
Average annual shortage	The average annual shortage that occurs under each alternative provides important summary information for Lower Basin water users and context for reservoir-based performance

¹³ Dead pool and Hoover Dam infrastructure can start to impact Lake Mead's ability to make deliveries to the Lower Basin at elevation 950 feet. Restrictions on water deliveries would occur when Lake Mead is near dead pool, resulting in large reductions (referred to as "dead pool-related reductions"). Although not considered an operational element of the alternatives, accounting for such reductions is an important performance metric.

Metric Name	Description
Average water year releases from Glen Canyon Dam	The average water year release from Glen Canyon Dam that occurs under each alternative provides important context for reservoir-based performance

The elevations described in **Table 2-6** have operational relevance, and comparing alternative performance relative to these elevations provides meaningful insight. In practice, operational implementation would include identifying elevations above critical thresholds (i.e., 3,490 feet and 950 feet) at which additional responsive actions could be taken in advance to avoid reaching those critical elevations. The “buffer” elevations shown in **Table 2-6** (i.e., 3,500 feet and 975 feet) may or may not represent correspond to operational decision for actual implementation; here, they are used for analytical purposes in this Final EIS.

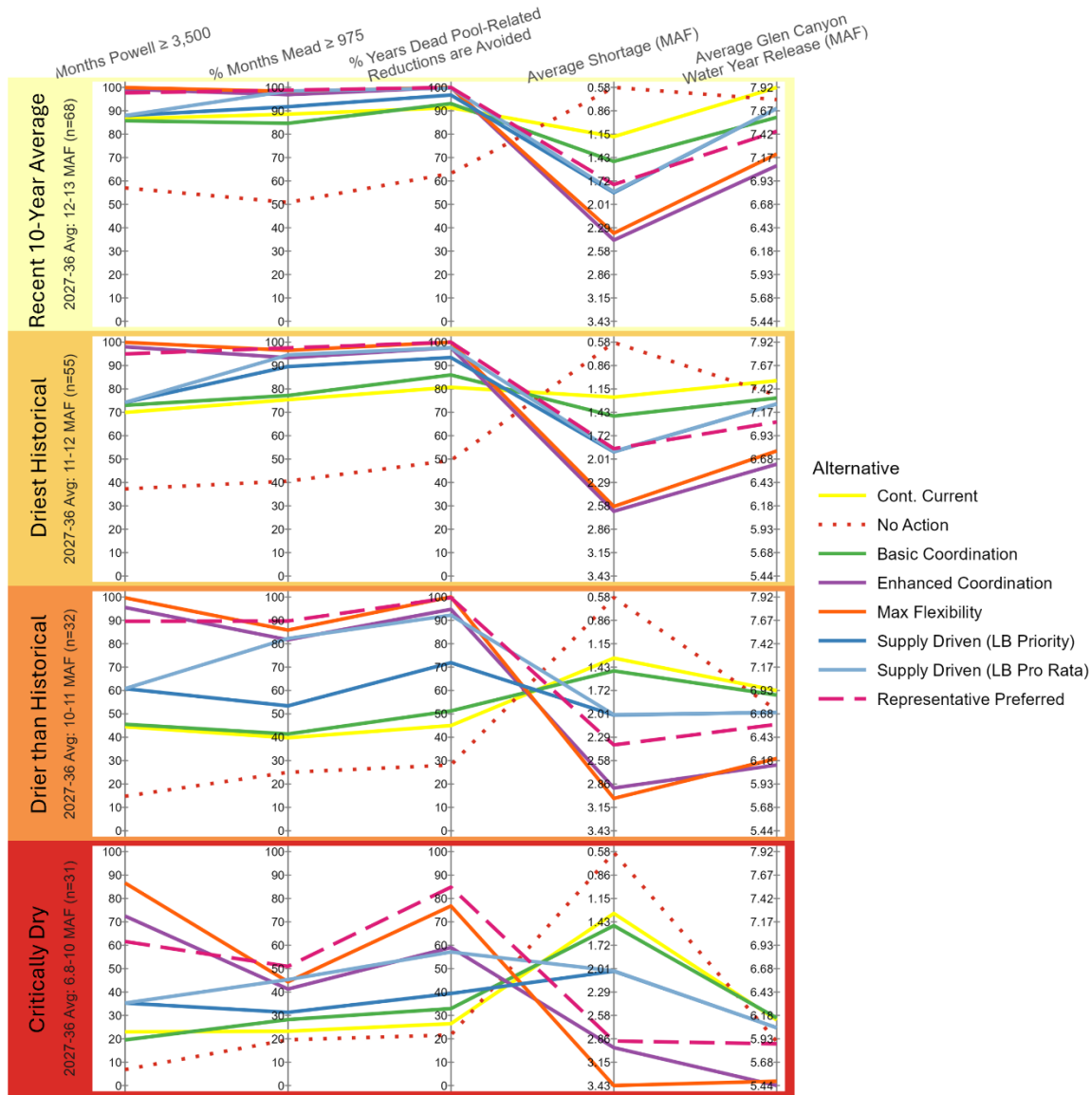
Figure 2-3 summarizes how the alternatives and the Continued Current Strategies Comparative Baseline¹⁴ (labeled “Cont. Current”) perform over the next 10 years in five vertical axes that correspond to the five key metrics described in **Table 2-6**. The performance of each alternative is captured by a colored, segmented line that crosses the axes at different vertical positions, where the height denotes performance. Crossing lines are a visual cue that there is a tradeoff between different performance metrics. The five-metric performance summary is divided into four categories of potential 2027-2036 future hydrologic conditions that get increasingly dry from top to bottom.¹⁵ The hydrologic categories are summarized in **Table 2-7**. Results are divided into these categories to demonstrate how the alternatives respond under different assumptions about future hydrologic conditions and to explore the impacts of hydrology on performance tradeoffs.

A key performance tradeoff demonstrated by **Figure 2-3** is the tradeoff between percent of time in which critical reservoir elevations and dead pool-related reductions are avoided (first three axes from left) and average shortage (fourth axis from left). In the Recent 10-Year Average hydrologic category, this stands out as a difference between the No Action Alternative and the action alternatives, but in the drier hydrologic categories (especially Drier than Historical and Critically Dry), the performance differences between the action alternatives becomes clearer and the tradeoffs (indicated by the crossing lines) become steeper: the Maximum Operational Flexibility and Enhanced Coordination Alternatives incorporate large shortages and better protect the reservoirs; the Supply Driven Alternative (both LB Priority and LB Pro Rata approaches) and the Basic Coordination Alternative have lower volumes of shortage and lower reservoir protection; and the No Action Alternative provides minimal protection and results in a high frequency of dead pool-related reductions while imposing minimal shortage. Across hydrologic categories, the Representative Preferred Alternative balances tradeoffs differently than other action alternatives. This is evident beginning in the Driest Historical hydrologic category, where it provides protection of Lake Powell and Lake Mead elevations similar to the most protective alternatives, while the average shortage volumes are similar to the Supply Driven Alternative (both LB Priority and LB Pro Rata approaches).

¹⁴ This scenario represents no changes from current operations and relies on strategies and agreements that expire in 2026. It is provided as a comparative baseline to inform an understanding of how the alternatives perform relative to current operations.

¹⁵ Wetter futures were also tested and are included in the impact analysis; however, for this analysis the hydrologic categories shown are most informative.

Figure 2-3
Key Performance Tradeoffs in Different Hydrologic Conditions



Note: Differences in Lake Mead performance between Supply Driven (Lower Basin [LB] Priority approach) and the Supply Driven (LB Pro Rata approach) Alternatives reflect how different shortage distributions interact with assumptions regarding the use of the storage and delivery mechanism for conserved water.

Table 2-7
Hydrologic Categories Included in Figure 2-3

Hydrologic Category	Average Annual Simulated Lees Ferry Flow, 2027-2036 (maf)	Description
Recent 10-Year Average	12-13	Hydrologic conditions in this category are similar to the historical average from 2016-2025 (12.1 maf) ¹⁶
Driest Historical	11-12	Hydrologic conditions in this category are similar to the driest 10-year period in the historical record (11.8 maf, 2012-2021)
Drier than Historical	10-11	Hydrologic conditions in this category are 7-15% (0.8 to 1.8 maf) drier than the driest 10-year period in the historical record
Critically Dry	<10	Hydrologic conditions in this category are 15-42% (1.8-5.0 maf) drier than the driest 10-year period in the historical record

In Drier than Historical hydrologic futures, the Maximum Operational Flexibility and Enhanced Coordination Alternatives show that lower WY releases from Glen Canyon Dam provide more protection to keep Lake Powell above 3,500 feet, while the higher water year releases in the Basic Coordination and Supply Driven (both LB Priority and LB Pro Rata approaches) Alternatives result in significantly higher frequencies of Lake Powell falling below 3,500 feet. The Representative Preferred Alternative falls in between the Supply Driven (both LB Priority and LB Pro Rata approaches) and Enhanced Coordination Alternatives: it releases less from Glen Canyon on average than the Supply Driven Alternative (both LB Priority and LB Pro Rata approaches) and better protects elevation 3,500 feet, but it releases more and offers less protection compared to the Enhanced Coordination Alternative. In the Critically Dry hydrologic category, water year releases are low across all alternatives, but only the Representative Preferred (62 percent of months), Enhanced Coordination (72 percent of months) and Maximum Operational Flexibility (87 percent of months) Alternatives protect 3,500 feet more than half of the time. The Supply Driven Alternative (both LB Priority and LB Pro Rata approaches) and Basic Coordination Alternative maintain elevations above 3,500 feet in 35 percent and 20 percent of months, respectively.

The effectiveness of large shortages at preventing dead pool-related delivery reductions is clearest in the Critically Dry hydrologic category, where the Representative Preferred, Maximum Operational Flexibility, and Enhanced Coordination Alternatives rely on large average shortages to significantly outperform the other alternatives in avoiding dead pool-related reductions. However, in Critically Dry conditions, even these more protective alternatives result in Lake Mead elevations below 975 feet in 49, 56, and 59 percent of months, respectively.

Figure 2-3 is a quantitative representation of system tradeoffs and shows how those tradeoffs are exacerbated by drying hydrologic conditions. The analysis in this figure demonstrates how the sideboards of the Preferred Alternative, as analyzed in the Representative Preferred Alternative,

¹⁶ The 10-year average for 2014-2023 (12.8 maf), 2015-2024 (12.6 maf), and 2016-2025 (12.1 maf) are all between 12.0 and 13.0 maf.

appropriately balance the tradeoffs across key system metrics and provide protection in conditions drier than the ongoing, unprecedented drought. The Representative Preferred Alternative achieves good performance across key system metrics related to critical infrastructure in the driest hydrologic conditions the Basin has experienced (Driest Observed Hydrology) but imposes lower average shortages and enables higher Glen Canyon Dam releases than other similarly protective alternatives. In conditions that are slightly drier than observed history (Drier than Historical Hydrology), the Representative Preferred Alternative maintains this moderate balance of performance between reservoir elevations, shortages, and Glen Canyon Dam releases. In the driest hydrologic conditions modeled (Critically Dry Hydrology), the ability of any set of operations to achieve good performance in these metrics is significantly diminished, but the Representative Preferred Alternative shows that the Preferred Alternative sideboards can protect critical infrastructure in the majority of these conditions while considering adverse impacts to Lower Basin water users.

2.6.2 Conclusions

This Final EIS analyzes a reasonable and broad range of alternatives for the operational elements identified in the proposed federal action. These alternatives were developed through extensive engagement with a wide range of partners and stakeholders as well as the public during a timeframe of over 4 years. In the absence of a consensus long-term agreement, Reclamation has included a Preferred Alternative decision framework in this Final EIS that establishes the operational principles, sideboards, and process that would govern development and adoption of operating guidelines through 2036.

The sideboards of the Preferred Alternative were analyzed through the Representative Preferred Alternative, and the analysis of the potential impacts of these sideboards provides environmental compliance for decisions made consistent with the decision framework. Based on the analysis in this Final EIS and the key tradeoffs shown above, the Preferred Alternative, as analyzed in the Representative Preferred Alternative, appropriately balances the inherent system tradeoffs: it is a practical approach to robust protection of critical infrastructure while considering adverse impacts to water users and avoiding unnecessary impacts to other resources.

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