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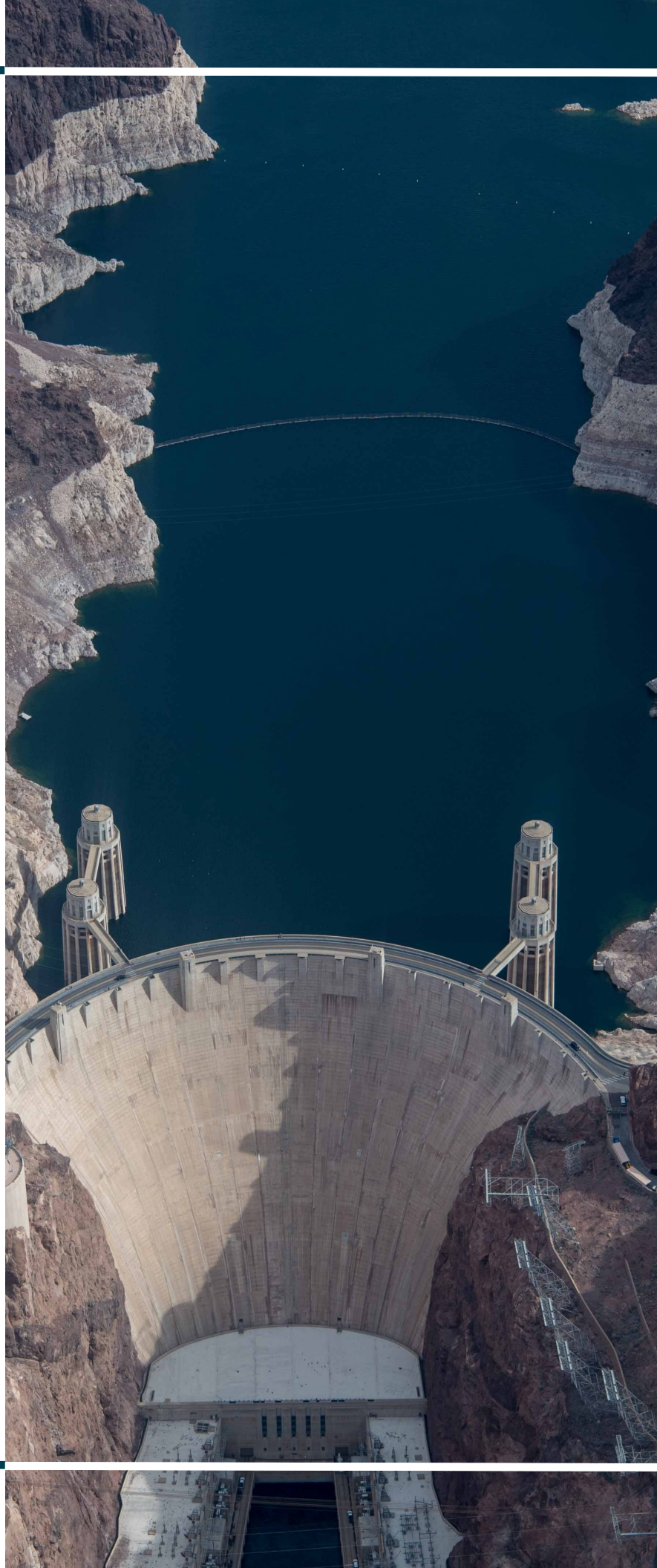
Final Environmental Impact Statement

Post-2026 Operational Guidelines and Strategies for Lake Powell and Lake Mead

Executive Summary



July 2026
U.S. Department of the Interior
Bureau of Reclamation
Upper and Lower Colorado Basins
Interior Regions 7 and 8

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Mission Statements

The **Department of the Interior** protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

The mission of the **Bureau of Reclamation** is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Photo: Alexander Stephens / Bureau of Reclamation, 2018

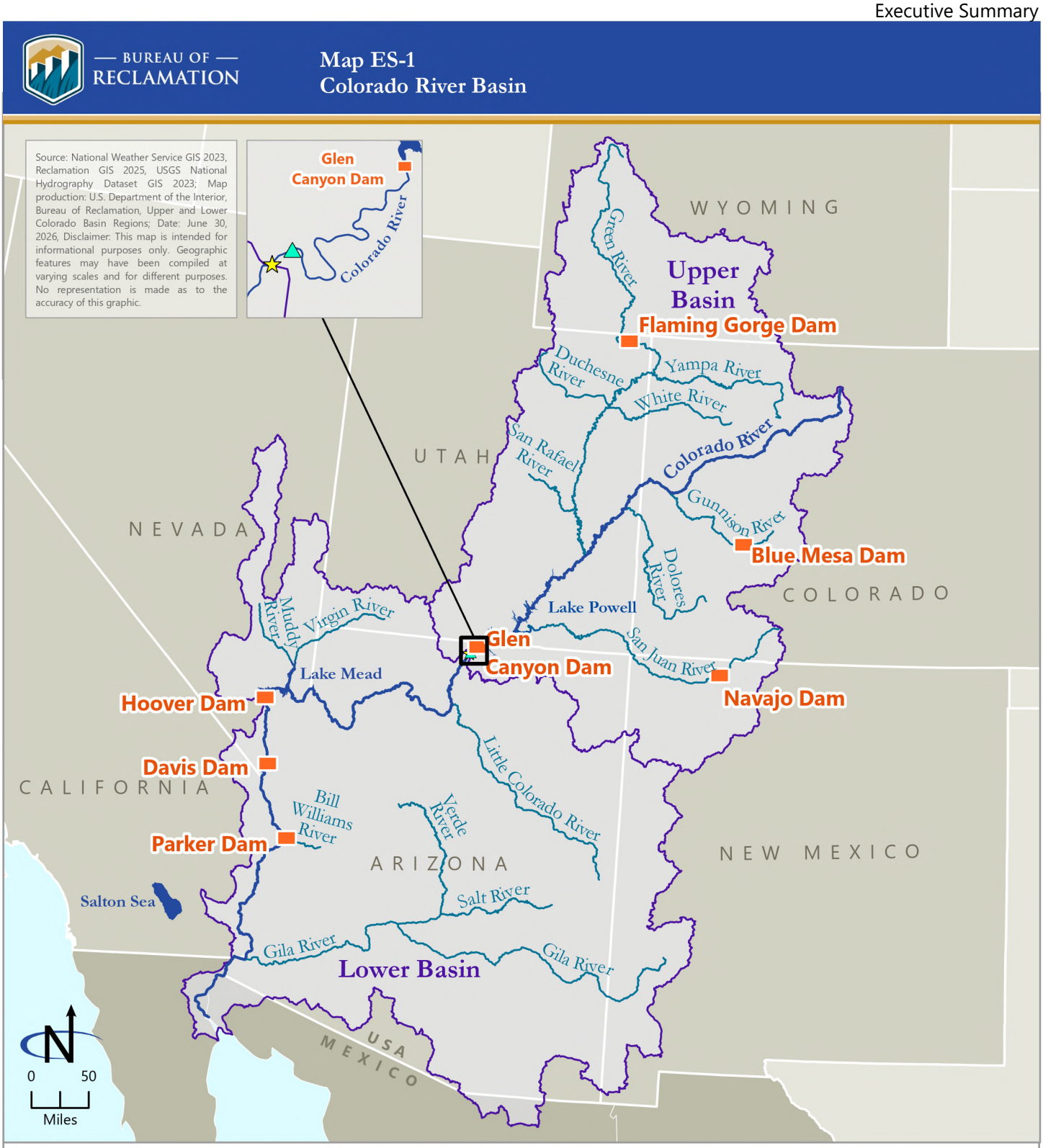
Executive Summary

ES.1 Background

The Colorado River Basin (Basin) provides essential water supplies to approximately 40 million people, nearly 5.5 million acres of agricultural lands, and habitat for ecological resources across seven states which includes broad areas in the Southwestern United States (U.S.) and Northwestern United Mexican States (Mexico) (**Map ES-1**). Prudent management of the Basin is critically important because the Colorado River is the foundation for diverse resources across a large geographic region and faces exceptional challenges from prolonged drought and future uncertainty. States, tribes, and Mexico rely on the Colorado River to support essential municipal, agricultural, environmental, cultural, and hydropower needs. These resources are now at significant risk: since the onset of the current drought in 2000, the Basin's primary reservoirs, Lake Powell and Lake Mead, have fallen to historically low elevations. Several of the major reservoir- and water-management documents and agreements developed to guide Colorado River operations through the persistently dry conditions expire in 2026, including the 2007 Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead (2007 Interim Guidelines; Reclamation 2007), the 2019 Colorado River Drought Contingency Plans (Reclamation 2019), and key international agreements between the U.S. and Mexico. Despite the significance of these agreements, actions taken over the past two decades have not been sufficiently robust to prevent continued decline of the reservoirs through the prolonged drought.

The Secretary of the Interior (Secretary), acting through the Bureau of Reclamation (Reclamation), proposes adoption of new guidelines and coordinated management strategies to address Lake Powell and Lake Mead through their full operating ranges to take effect when the current agreements expire in 2026. Management strategies will primarily focus on the operation of Glen Canyon Dam and Hoover Dam but may include actions upstream and downstream of these facilities to protect critical reservoir elevations, such as releases from the Colorado River Storage Project (CRSP) Upper Initial Units to increase the elevation at Lake Powell, and approaches to enhance opportunities for Lower Colorado River Basin (Lower Basin) water users to reduce water use (see **Map ES-1**).

This Final Environmental Impact Statement (EIS) has been prepared to inform the Secretary's timely adoption of a new set of objective guidelines that improve predictability to all water users and managers in the Basin. Developing new guidelines is difficult in this complex Basin, where critically low storage in Lake Powell and Lake Mead, significant hydrologic variability, and the anticipation of drier future conditions amplify the central tradeoff: balancing the potentially profound impacts of water-delivery reductions with the need to maintain reservoir storage. The alternatives in this Final EIS capture a broad range of management strategies to address this tradeoff, and they demonstrate that there are multiple ways to find a balance if conditions improve. If conditions do not improve, achieving a balance is more difficult, and, under critically dry futures, even large and unprecedented reductions may be needed and may not be enough to stabilize storage.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Map ES-1
Colorado River Basin
Source: National Weather Service GIS 2023, Reclamation GIS 2025, USGS National Hydrography Dataset GIS 2023; Map production: U.S. Department of the Interior, Bureau of Reclamation, Upper and Lower Colorado Basin Regions; Date: June 30, 2026, Disclaimer: This map is intended for informational purposes only. Geographic features may have been compiled at varying scales and for different purposes. No representation is made as to the accuracy of this graphic.
Glen Canyon Dam
Colorado River
WYOMING
Green River
Upper Basin
Flaming Gorge Dam
Duchesne River
Yampa River
White River
UTAH
San Rafael River
Colorado River
Gunnison River
Blue Mesa Dam
NEVADA
Dolores River
COLORADO
Muddy River
Virgin River
Lake Powell
Glen Canyon Dam
San Juan River
Navajo Dam
Lake Mead
Hoover Dam
Davis Dam
Little Colorado River
CALIFORNIA
Bill Williams River
Verde River
Parker Dam
NEW MEXICO
ARIZONA
Salton Sea
Salt River
Gila River
Gila River
Lower Basin
USA
MEXICO
N
0
50
Miles
Major dam
Lee Ferry Compact Point
Lees Ferry Gaging Station
Colorado River
Major Colorado River tributary
Colorado River Basin, Upper and Lower Basins
States in the Colorado River Basin (Wyoming, Colorado, Utah, and New Mexico are Upper Division states, and Arizona, California, and Nevada are Lower Division states)

Consistent with the Department of the Interior's (Department) longstanding preference for consensus-based management of the Colorado River System, the Department and Reclamation engaged extensively with the Basin States,[1] Basin Tribes,[2] and other interested parties during development of successor operating guidelines over the course of 4 years. However, despite those efforts, the Basin States did not reach consensus on long-term guidelines prior to the completion of this EIS. Accordingly, rather than adopting long-term operating guidelines of the same duration as the 2007 Interim Guidelines, the Secretary proposes in the Preferred Alternative to adopt an operational strategy consisting of an adaptive decision framework to develop operating guidelines for Lake Powell and Lake Mead for operating years 2027 through 2036. This framework provides for more robust operational provisions than the current guidelines while preserving the flexibility to respond to changing hydrologic conditions and to incorporate future consensus recommendations, should they be reached.

Reclamation, as the agency designated to act on the Secretary's behalf with respect to operation of Glen Canyon Dam and Hoover Dam and managing the mainstream waters of the lower Colorado River in accordance with federal law, is the lead federal agency for the purposes of compliance pursuant to the National Environmental Policy Act of 1969 (NEPA), as amended, for the development and implementation of the proposed interim guidelines. Five federal agencies are cooperating for purposes of assisting with environmental analysis and preparation of this EIS. The cooperating agencies are the Bureau of Indian Affairs, National Park Service, U.S. Fish and Wildlife Service, U.S. Section of the International Boundary and Water Commission (IBWC), and Western Area Power Administration. The Final EIS is organized into four volumes:

Volume I – EIS with the following chapters:

Chapter 1: Purpose and Need. Provides the background of Colorado River operations and describes why federal action is needed.

Chapter 2: Description of Alternatives. Describes the process of formulating alternatives, describes the Preferred Alternative, and presents a range of reservoir operation strategies and guidelines considered under each alternative. A summary of the performance tradeoffs between alternatives is provided at the end of Chapter 2.

Chapter 3: Affected Environment and Environmental Consequences. Describes the existing environmental conditions and evaluates potential impacts that could result from implementation of the alternatives.

Chapter 4: Consultation and Coordination. Describes public and stakeholder involvement process during the preparation of this Final EIS.

[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.

Volume II – Supporting appendices, primarily focused on modelling information, including modeling assumptions, analytical methods, and supporting calculations.

Volume III – Technical appendices for each of the environmental resources discussed in Chapter 3. These appendices provide supporting and more detailed information.

Volume IV – List of persons contributing to the preparation of this Final EIS, list of references cited in this Final EIS, glossary of commonly used terms, and index.

ES.1.1 Purpose and Need for Action

The proposed federal action is needed for the following reasons:

- *The Secretary is legally required to coordinate operations of Colorado River reservoirs:* The Colorado River Basin Project Act of 1968 directs the Secretary to adopt criteria for the coordinated long-range operation of Colorado River reservoirs. In compliance with this obligation, the Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs Pursuant to the Colorado River Basin Project Act of September 30, 1968 (Long-Range Operating Criteria [LROC]; Colorado River Basin Project Act of 1968 [CRBPA]; Reclamation 1970) were developed and adopted by the Secretary in 1970. The LROC provides general narrative guidance regarding Lake Powell and Lake Mead operations but does not contain specific, objective criteria to guide annual operations. To address this inadequacy, the 2007 Interim Guidelines were developed to provide objective criteria used by the Department to implement the LROC. The 2007 Interim Guidelines have provided the predictability needed by the entities that receive Colorado River water to better plan for and manage available water supplies from the Colorado River and other sources.
- The *2007 Interim Guidelines are expiring:* Current operational guidelines expire during the 2026 operating year. The Department has determined that specific, objective operational guidelines are important to provide improved predictability and should be established for another interim period beyond 2026. Most of the federal and non-federal agreements associated with implementing provisions of the 2007 Interim Guidelines also expire after the 2026 operating year.
- *The 2007 Interim Guidelines have not sufficiently reduced risk:* Based on operational experience since 2007, the current guidelines are not robust enough to manage the system in a way that is sufficiently protective of the resources dependent on the Colorado River. Despite near-continuous drought-response actions in recent years, low reservoir conditions have persisted, and new infrastructure risks at Glen Canyon Dam have arisen. More robust and adaptive guidelines are needed for the efficient and sustainable management of the major mainstream Colorado River reservoirs and system resources.
- *Imbalance between water supply and demand will be exacerbated by increasingly likely low-runoff conditions:* The Basin is experiencing increased aridity due to climate variability, and long-term drought and low-runoff conditions are expected in the future. These conditions will exacerbate the now widely recognized imbalance between water supply and demand in the Basin. Robust and flexible guidelines are needed to manage the Colorado River system and its resources under a broad range of potential future hydrologic conditions.
- *Expanded and innovative use of conservation is needed:* Recognizing the anticipated future low-runoff conditions in the Basin, the Department has also determined a need for guidelines that provide

Colorado River water users, including Basin Tribes, expanded opportunities to conserve, store,exchange, and take subsequent delivery of water in and from Lake Mead and/or Lake Powell. The guidelines should also support and integrate future efficiency improvements and opportunities for augmentation.

- *Addressing tribal concerns regarding Basin management is needed:* Basin Tribes have expressed concern that the current approach to Colorado River water management is insufficient to address the range of interests, needs, and fundamental rights of the Basin Tribes. The Department has determined a need for guidelines that provide flexibility and predictability for Basin Tribes to remain able to benefit from their water rights and have opportunities to participate in voluntary conservation programs.

The purpose of the proposed federal action is to:

- Update and expand management guidelines for Colorado River reservoirs, particularly for the coordinated operation of Lake Powell and Lake Mead
- Provide Colorado River water users a greater degree of predictability with respect to annual water availability in future years under anticipated increasing variability, low runoff, and low reservoir conditions
- Provide additional mechanisms for the conservation, exchange, storage, and delivery of water supplies in Colorado River reservoirs to increase the flexibility to meet water use needs
- Provide new or enhanced opportunities for Basin Tribes to benefit from their water rights
- Provide flexibility to build resilience and accommodate future needs and growth that are supported by Colorado River water supplies, including the integration of unquantified tribal water rights once they are resolved

ES.1.2 Proposed Federal Action

Reclamation, acting on behalf of the Secretary, proposes to adopt guidelines and coordinated reservoir management strategies to address operations of Lake Powell and Lake Mead through their full operating ranges. This action would improve predictability to all water users and managers in the Basin by developing and adopting objective guidelines for the operation of Glen Canyon Dam and Hoover Dam to take effect when the current operating guidelines expire in 2026. This action is designed to provide for the sustainable management of the Colorado River system and its resources under a wide range of potential future system conditions.

The proposed federal action considers the following operational elements that are collectively designed to address the purpose and need for the proposed federal action:

1) Identification of circumstances under which the Secretary would allocate the annual amount of water available for consumptive use from Lake Mead to the Lower Division states (Arizona, California, and Nevada) at, below, or above 7.5 million acre-feet (maf), pursuant to the Supreme Court Decree in *Arizona* v. *California,* 376 U.S. 340 (1964) (Final Decree entered in 2006).
2) Coordinated operations of Lake Powell and Lake Mead, particularly under low reservoir conditions.
3) Storage and delivery of conserved water in Lake Mead and/or Lake Powell to increase the flexibility to meet water use needs from both reservoirs, including the storage and delivery of

non-system water; exchanges; and water conserved through extraordinary measures by or for tribal, agricultural, or municipal entities.

The proposed federal action allows for development of robust operating guidelines for Lake Powell and Lake Mead without precluding upstream or downstream actions needed to protect critical reservoir elevations at Lake Powell and Lake Mead, such as the following:

- Approaches that consider total system storage in all major Colorado River reservoirs and/or actual inflows to determine coordinated operations of Lake Powell and Lake Mead.
- Approaches that include opportunities for conservation, augmentation, demand management, or other water management strategies (such as exchanges or transfers).
- Modified operations at upstream CRSP Upper Initial Units[3] to release additional water if needed to protect critical infrastructure at Glen Canyon Dam.

The Secretary intends that the guidelines be interim in nature and extend for the same duration as the 2007 Interim Guidelines (approximately 20 years). Adoption of new guidelines for an interim (or limited) period provides the opportunity to gain additional experience for operating the reservoirs, thereby informing future operational and water management decisions.

Recognizing additional authorities may be developed, the Department intends to adopt and implement the guidelines in a manner consistent with the Law of the River. The Department also intends that the guidelines be used to implement the LROC and applicable federal law through the issuance of the Annual Operating Plan for Colorado River Reservoirs.

ES.1.3 Geographic Scope

Consistent with the geographic scope analyzed in the 2007 Interim Guidelines Final EIS, the geographic scope that would be affected by the proposed federal action begins at full pool of Lake Powell at Gypsum Canyon and extends downstream along the mainstream Colorado River floodplain to the Southerly International Boundary (SIB) with Mexico. This proposed federal action would also potentially affect interests of water users in the Lower Division States in service areas that extend beyond the mainstream of the Colorado River.

Although the proposed federal action is focused on Lake Powell and Lake Mead operations, management strategies that include activities upstream of Lake Powell are being analyzed in this Final EIS. These activities include Upper Colorado River Basin (Upper Basin) conservation and, if warranted to protect critical reservoir elevations, coordinated operations of the CRSP Upper Initial Units to release additional water within their respective Records of Decision (RODs) to increase the elevation at Lake Powell. Operations at the CRSP Upper Initial Units specifically contemplated in this Final EIS are intended to remain within the scope of the existing RODs.[4] Since those RODs are covered by their own NEPA, this Final EIS does not need to expand the geographic scope of analysis

[3] CRSP Upper Initial Units include Flaming Gorge, Blue Mesa (a component of the Aspinall Unit), and Navajo reservoirs. Current RODs governing operations of these units were signed in 2006, 2012, and 2006, respectively.

[4] While the Secretary will consider and prioritize operations at these facilities that are consistent with existing RODs, the Secretary retains the authority to operate outside those RODs if necessary. The modeling assumptions regarding operation of the CRSP Upper Initial Units presented in this Final EIS are not intended to, and do not, limit the Secretary's ability to operate these facilities as necessary to respond to hydrologic conditions in accordance with applicable federal law, including operations for the authorized purposes as stated in the 1956 Colorado River Storage Project Act.

upstream of Lake Powell. With respect to Upper Basin conservation, the nexus to the proposed federal action is the storage and delivery of that conserved water in Lake Powell. The effects of this storage in and delivery from Lake Powell are within the scope of the EIS, while specific activities that may be undertaken in the Upper Basin to generate the conserved water are not within the scope of this EIS. Any such activities are unknown at this time and will not necessarily require federal decision making. Any federal decisions associated with these conservation activities will be assessed outside of this EIS.

ES.2 Alternatives

ES.2.1 Alternative Development

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 through publication of this Final EIS.

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. Additionally, Reclamation developed an online platform, the Post-2026 Operations Exploration Web Tool, allowing stakeholders, interested parties, and the public to independently or collaboratively design operational strategies to inform their input to the NEPA process.

On January 9, 2026, the Environmental Protection Agency 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. Since Draft EIS publication, the Department has also continued to work with the Basin States and Basin Tribes to facilitate development of a consensus agreement. Despite this extensive engagement, a long-term consensus-based approach to Basin reservoir operations has not yet been achieved.

This Final EIS analyzes a No Action alternative and five action alternatives that incorporate over 4 years of input provided by stakeholders and the public and received through consultations with the Basin States and Basin Tribes. These alternatives capture a broad range of operational concepts and potential environmental impacts:

- Preferred Alternative (added since publication of the Draft EIS)
- No Action Alternative
- Basic Coordination Alternative
- Enhanced Coordination Alternative

- Maximum Operational Flexibility Alternative
- Supply Driven Alternative

ES.2.2 The Preferred Alternative

In the absence of a long-term consensus-based approach, Reclamation has developed a Preferred Alternative and analyzed it in this Final EIS. The Preferred Alternative is a 10-year decision framework. 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 through 2036.

The decision framework in the Preferred Alternative offers a vehicle for continued work toward sustainable 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. The framework (principles, sideboards, and process) would remain constant through 2036, unless modified through future federal action and appropriate environmental compliance.

ES.2.2.1 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.

ES.2.2.2 Operational Principles

The operational principles are designed to ensure 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 the necessary management actions, consistent with applicable federal law.

ES.2.2.3 Operational Sideboards

The decision framework's operational sideboards are key thresholds and ranges for the four operational elements (described below) 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 ES-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 ES-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 kaf in addition to Flood Control and Quantified Surplus

Operational Element	Operational Ranges
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 kaf per year subject to hydrologic conditions

In contrast to the specified operations under the other alternatives analyzed in this Final EIS, 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 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.

ES.2.2.4 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.

ES.2.3 Summary of Alternatives

Each alternative is comprised of four operational elements: (1) Guidelines to Reduce or Increase Deliveries from Lake Mead, (2) Coordinated Reservoir Operations (Lake Powell and Lake Mead), (3) Storage and Delivery of Conserved System and Non-System Water, and (4) Additional Activities Above Lake Powell. Each element is varied across the alternatives providing a reasonably broad range of Colorado River operations that capture an appropriate range of potential environmental impacts. **Table ES-2** summarizes the representation of these elements in the No Action Alternative and the five action alternatives considered and evaluated in this Final EIS.

Table ES-2
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 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 • 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.

<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 7.0 to 9.5 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 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 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 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 Mead[3]	**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 Mead[3]**	**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.

<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
• Shortages distributed using two approaches: LB Priority and LB Pro Rata</td><td>• 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</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 500.0 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</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 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.

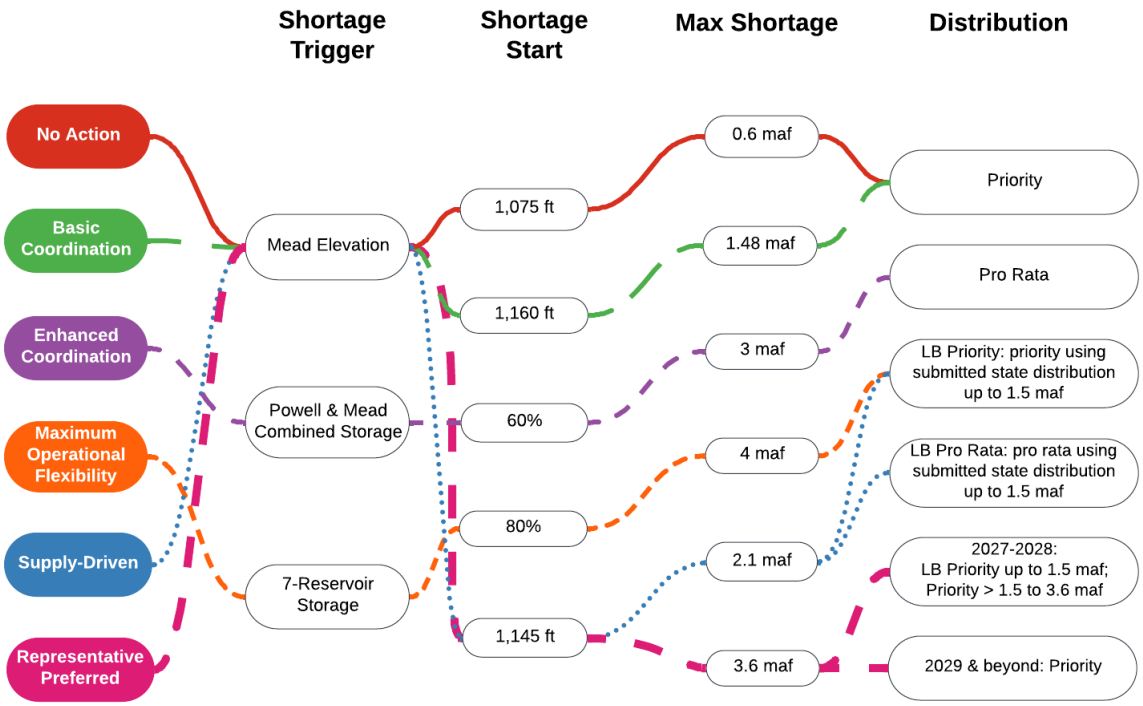
ES.2.4 Range of Alternatives

The Final EIS incorporates a reasonable and broad range of alternatives in accordance with NEPA. The figures below demonstrate the broad range of operational approaches incorporated into the alternatives by summarizing them across the following categories: Lower Basin Shortage Guidelines, Coordinated Reservoir Operations, Lake Mead Storage and Delivery of Conserved Water, and Activities above Lake Powell. For each figure below, the individual lines connect each alternative with the approach(es) that Reclamation has analyzed within that alternative.

ES.2.4.1 Lower Basin Shortage Guidelines

Figure ES-1, Lower Basin Shortage Guidelines, shows the range of approaches considered for factors that would trigger Lower Basin shortage, the level at which shortages would start, the maximum Lower Basin shortage amount, and the method(s) by which shortages would be distributed among Lower Basin water users.

Figure ES-1
Lower Basin Shortage Guidelines

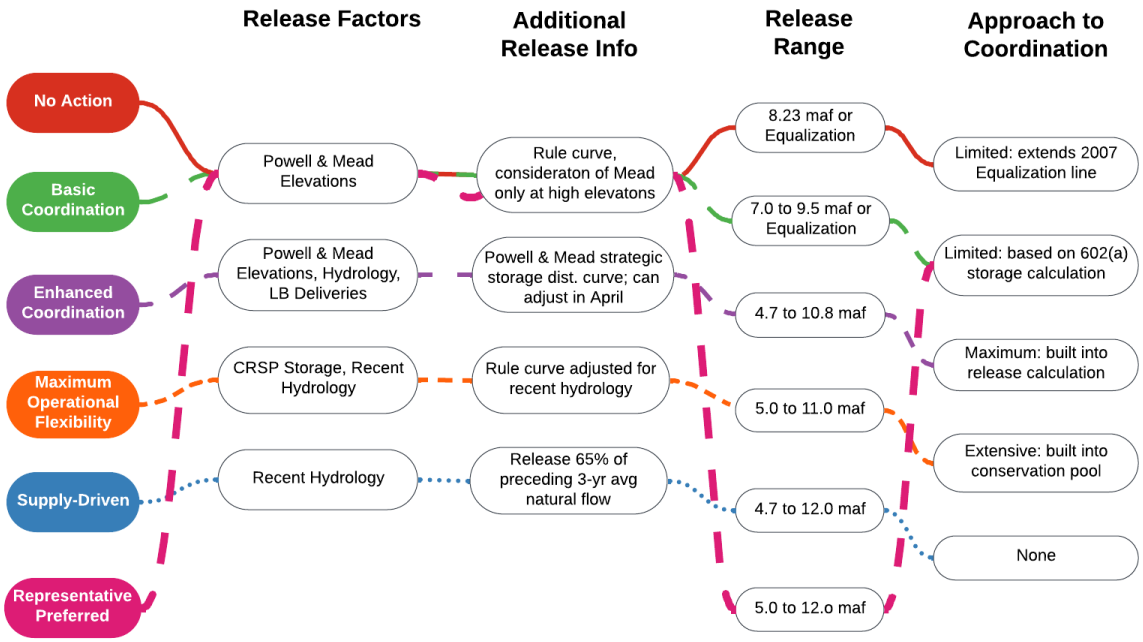


Notes: Additional restrictions in water deliveries will occur when Lake Mead is near dead pool, resulting in large reductions (referred to as "dead pool-related reductions"). These are not considered an operational element of the alternatives.
The "Representative Preferred Alternative" is a set of modeling assumptions designed around the Preferred Alternative sideboards. The specific operating guidelines for each operating interval during the term of the Preferred Alternative may differ.
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.

ES.2.4.2 Coordinated Reservoir Operations

Figure ES-2, Coordinated Reservoir Operations, shows the range of approaches considered for the factors that would determine Lake Powell water year release volumes, additional information about the structure of operations, the range of water year release volumes that could occur based on those factors, and the approach to coordination of operations between Lake Powell and Lake Mead (that is, how dependent operations of Lake Powell would be on conditions at Lake Mead).

Figure ES-2
Coordinated Reservoir Operations

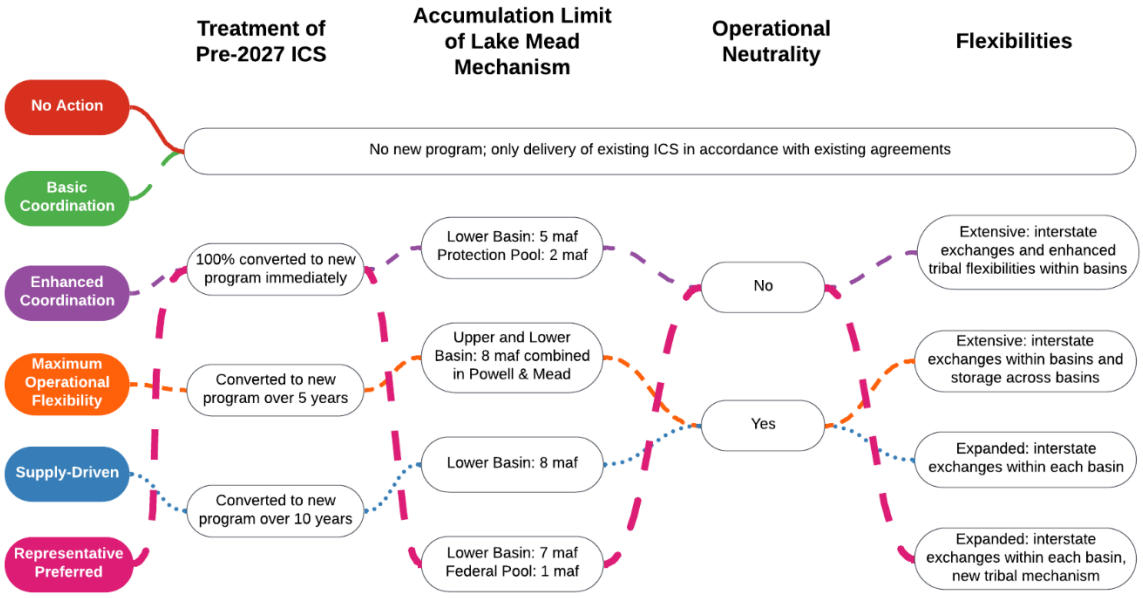


Note: The "Representative Preferred Alternative" is a set of modeling assumptions designed around the Preferred Alternative sideboards. The specific operating guidelines for each operating interval during the term of the Preferred Alternative may differ.

ES.2.4.3 Lake Mead Storage and Delivery of Conserved Water

Figure ES-3, Lake Mead Storage and Delivery of Conserved System Water, shows the range of approaches considered to incorporate this mechanism, including how Intentionally Created Surplus created prior to 2027 is converted into a new mechanism, the maximum amount of conserved water that could be stored in Lake Mead, whether stored conserved water is excluded from determinations of Lake Powell releases and shortage volumes ("operational neutrality"), and the level of flexibilities for transactions of stored conserved water between users.

Figure ES-3
Lake Mead Storage and Delivery of Conserved System Water

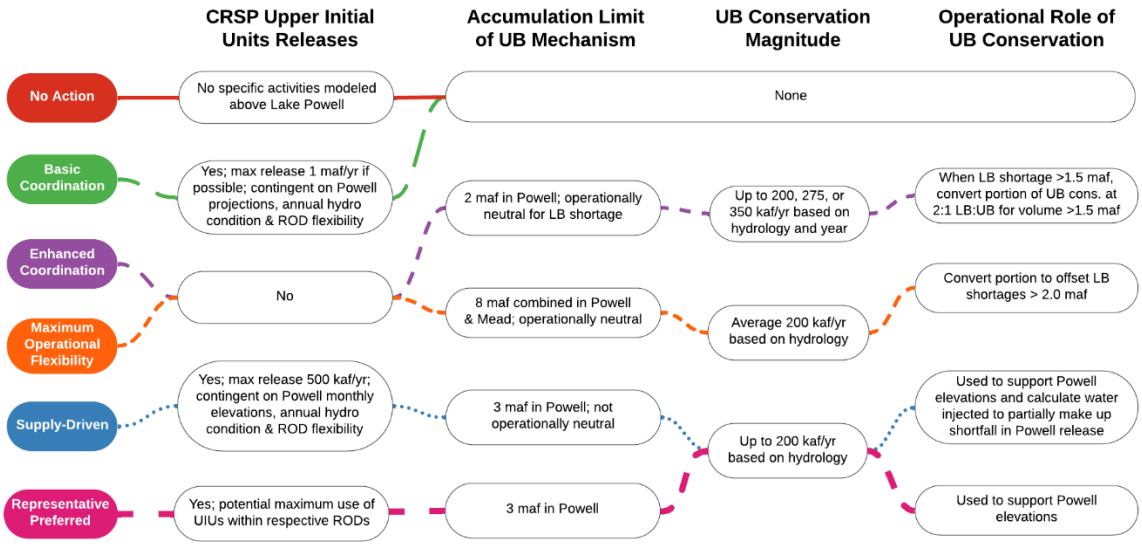


Notes: Accumulation limits include modeling assumptions for storage available to Mexico. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current U.S. policy or a determination of future U.S. policy regarding deliveries 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.
The "Representative Preferred Alternative" is a set of modeling assumptions designed around the Preferred Alternative sideboards. The specific operating guidelines for each operating interval during the term of the Preferred Alternative may differ.

ES.2.4.4 Activities Above Lake Powell

Figure ES-4, Activities Above Lake Powell, shows the range of approaches to releases from CRSP Upper Initial Units to protect Glen Canyon Dam infrastructure, the maximum amount of conserved water that could be stored, assumptions about the amount of annual Upper Basin conservation, and rules for when Upper Basin conserved water would be converted to system water.

Figure ES-4
Activities Above Lake Powell



Note: The "Representative Preferred Alternative" is a set of modeling assumptions designed around the Preferred Alternative sideboards. The specific operating guidelines for each operating interval during the term of the Preferred Alternative may differ.

ES.3 Potential Environmental Effects

ES.3.1 Analysis Methods

The analysis for this Final EIS uses a Decision Making under Deep Uncertainty (DMDU) approach, drawn from a well-established branch of decision science, that is designed to account for uncertainty in future Basin conditions. The most impactful and largest source of uncertainty is future hydrology. Since 2000, hydrologic conditions drier than those in the previously observed record have continued to occur, confounding ongoing efforts to manage system risk. Reclamation began significant investments in research to improve hydrologic predictions and understanding of long-term supply outlooks in 2004, but there have been only limited improvements in prediction skill and long-term hydrologic projections continue to show a wide range of possibilities around the overall likelihood of a drier future. Therefore, long-term planning in the Basin must account for conditions of *deep uncertainty*, which occur when it is not possible to confidently assign probabilities to specific future conditions. Population growth and changes in water use in the Basin also contribute to the challenge of planning for a deeply uncertain future.

Alongside research into understanding hydrologic uncertainty, Reclamation has also invested in decision science research through the development of DMDU methods that allow for reliable analysis despite the uncertainty. Development of DMDU applications in the Basin stems from a collaboration with the RAND Corporation during the 2012 Colorado River Basin Water Supply and Demand Study, when the methods were introduced into Reclamation's long-term planning. The DMDU framework used here enhances the ability to evaluate the robustness of the alternatives – that is, their ability to meet important performance objectives in a wide range of futures. It also supports the identification of future conditions that could cause vulnerability to critical system conditions. A focus on robustness and vulnerability prevent overreliance on the types of probabilistic risk projections that, in previous planning efforts, did not convey the actual risks facing the system and contributed to insufficient protection against the ongoing drought.

The hydrologic modeling performed for this analysis employs DMDU by testing the system in 400 potential futures that cover a wide range of hydrologic conditions. This hydrologic modeling generated projections of future Colorado River system conditions (such as reservoir elevations, reservoir releases, and river flows) for the alternatives. These system projections serve as the basis for analyzing potential effects on other environmental resources (e.g., recreation, biological resources, and energy) and any associated resource specific models. For each resource, the analysis describes robustness across this wide range, identifies specific conditions that could cause vulnerability, and provides important context for interpreting those findings without overconfidently predicting system outcomes. This aligns with the guidance provided in Executive Order "Restoring Gold Standard Science" from May 2025, and provides a sound basis for comparing the alternatives' ability to meet key performance thresholds for resources throughout the Basin.

ES.3.2 Summary of Environmental Consequences

The analysis focuses on specific issues identified during internal and public scoping for all affected environmental resources (e.g., hydrologic, biologic, and socioeconomic). Resources considered but determined to not be significantly impacted by the action include transportation, noise, light, and minerals.

A summary of environmental consequences is provided in **Table ES-7**, Summary of Potential Effects of the Alternatives, located at the end of this Executive Summary. Performance indicators were developed to address the specific issues raised during scoping. Throughout, a higher percentage reflects better performance. Where quantitative or DMDU results are not possible, a qualitative description of potential impacts is provided. The affected environment and environmental consequences are discussed in detail in Chapter 3 and the associated resource appendices.

ES.4 Synthesis of Performance in Key Metrics

The action alternatives together capture a wide range of concepts across the operational elements that make up an alternative; this operational variety produces a wide range of potential system outcomes. The following sections provide an overview of performance and vulnerability over the period 2027-2036, which is significant because the Preferred Alternative is a 10-year decision framework. The Preferred Alternative, as analyzed in the Representative Preferred Alternative, is compared to the other

action alternatives, the No Action Alternative, and the Continued Current Strategies Comparative Baseline below.

ES.4.1 Performance Tradeoffs among Key System Metrics

ES.4.1.1 Introduction

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.

ES.4.1.2 Tradeoff 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 ES-3** also provides important insight into the tradeoffs among other resources.

Table ES-3
High Level Performance Metrics Included in Figure ES-5

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 compromised 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[5] 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
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

[5] 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 in water deliveries will 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.

The elevations described in **Table ES-3** 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 ES-3** (i.e., 3,500 feet and 975 feet) may or may not correspond to operational decision for actual implementation; here, they are used for analytical purposes in this Final EIS.

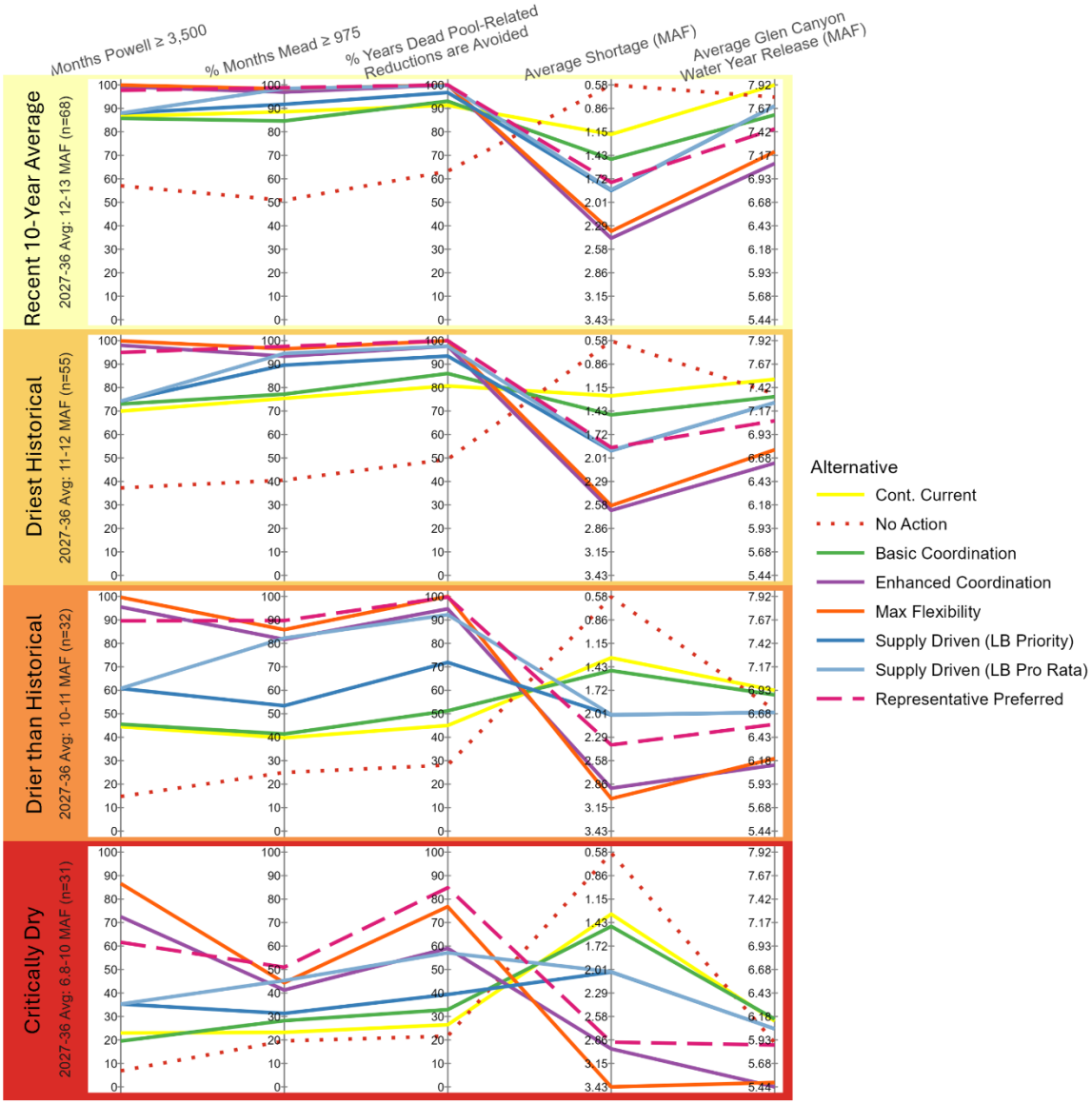
Figure ES-5 summarizes how the alternatives and the Continued Current Strategies Comparative Baseline[6] (labeled "Cont. Current") perform over the next 10 years in five vertical axes that correspond to the five key metrics described in **Table ES-3**. The performance of each alternative is captured 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.[7] The hydrologic categories are summarized in **Table ES-4**. 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.

Table ES-4
Hydrologic Categories Included in Figure ES-5

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)[8]
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

[6] 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.
[7] Wetter futures were also tested and are included in the impact analysis; however, for this analysis the hydrologic categories shown are most informative.
[8] 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 and 13 maf.

Figure ES-5
Key Performance Tradeoffs in Different Hydrologic Conditions



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

A key performance tradeoff demonstrated by **Figure ES-5** 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 Alternatives 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 Alternatives.

In Drier than Historical hydrologic futures, the Maximum Operational Flexibility and Enhanced Coordination Alternatives show that lower water year releases from Glen Canyon Dam provide more protection to keep Lake Powell above 3,500 feet, while the higher water year releases in Basic Coordination and Supply Driven result in significantly higher frequencies of Lake Powell falling below 3,500 feet. The Representative Preferred Alternative falls in between Supply Driven and Enhanced Coordination Alternatives: it releases less from Glen Canyon on average than the Supply Driven Alternative 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 Alternatives 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 ES-1 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, 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 Historical 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.

ES.4.2 Vulnerability Analysis for Key Reservoir Elevations

The analysis related to **Figure ES-5** examines tradeoffs and the influence of different hydrologic scenarios on the alternatives' performance in important metrics. **Table ES-5** and **Table ES-6**, below, provide insight into what specific hydrology is likely to cause the system to be vulnerable to critical conditions under different alternatives and whether those conditions are similar to anything from the observed record. This context is helpful in understanding whether the conditions leading to vulnerability could be reasonably expected based on history.[9] Based on analysis of 400 modeled hydrologic futures, an average-flow threshold was identified for each alternative that skillfully predicted the occurrence of a critical system condition at least once within 10 years of implementation (between 2027 and 2036).

Table ES-5
Vulnerability to Lake Powell Falling Below Elevation 3,500 Feet at Least Once in the First 10 Years and Comparison to Historical Conditions

Alternative	Water Year 2027-2036 Average Natural Flow that Could Cause Vulnerability (maf/year)	Number of Years Below Threshold 2000-2025 (Historical Data)	Number of Years Below Threshold 1906-2025 (Historical Data)
Cont. Current	≤12.1	3	4
No Action	≤19.6	26	111
Basic Coordination	≤11.9	1	1
Enhanced Coordination	≤9.3	0	0
Max Flexibility	≤8.1	0	0
Supply Driven (LB Priority)	≤12.5	7	9
Supply Driven (LB Pro Rata)	≤12.5	7	9
Representative Preferred	≤10.1	0	0

[9] Information about how the vulnerability thresholds compare to projections of future conditions, which include the potential for a drier future, can be found in **Technical Appendix 3**, Hydrologic Resources.

Table ES-6
Vulnerability to Lake Mead Falling Below Elevation 975 Feet at Least Once in the First 10 Years and Comparison to Historical Conditions

Alternative	Water Year 2027-2036 Average Natural Flow that Could Cause Vulnerability (maf/year)	Number of Years Below Threshold 2000-2025 (Historical Data)	Number of Years Below Threshold 1906-2025 (Historical Data)
Cont. Current	≤11.6	0	0
No Action	≤14.5	23	67
Basic Coordination	≤11.3	0	0
Enhanced Coordination	≤9.7	0	0
Max Flexibility	≤10.0	0	0
Supply Driven (LB Priority)	≤11.1	0	0
Supply Driven (LB Pro Rata)	≤9.7	0	0
Representative Preferred	≤10.0	0	0

With respect to Lake Powell falling below elevation 3,500 feet at least once in the next 10 years, the Supply Driven Alternative is the most vulnerable action alternative: under these operations, Lake Powell would likely fall to critical elevations if the 10-year average natural flow at Lees Ferry is 12.5 maf or lower. Hydrologic conditions this dry or drier occurred in 7 years since 2000. With respect to Lake Mead falling below elevation 975 feet at least once in the next 10 years, the flow thresholds indicating vulnerability are drier for all of the action alternatives than any observed historical conditions. However, conditions this dry do occur in the set of 400 hydrologic traces analyzed in this EIS, which includes the potential for a future drier than historical observations (see **Appendix F**, Approach to Hydrologic Uncertainty, for information about the 400 hydrologic traces).

Modeling indicates that the Representative Preferred Alternative would likely be vulnerable to Lake Powell falling below 3,500 feet if the 2027-2026 average flow is 10.1 maf or less and Lake Mead falling below 975 feet if the 2027-2036 average flow is 10.0 maf or less. The Representative Preferred Alternative is reasonably unlikely to be vulnerable in the next 10 years because these conditions have not occurred and are about 15 percent drier than the driest 10-year period on record (2012-2021, average of 11.8 maf). However, estimates for 2026 natural flow suggest 2017-2026 will become the driest 10-year period on record (about 11.5 maf), reflecting that hydrology could continue to decline relative to the comparisons in this table. The possibility for a drier future is reflected in the set of 400 hydrologic traces analyzed in this EIS.

ES.4.3 Conclusions

A number of reservoir and water management decisional documents and agreements that govern operation of Colorado River facilities and management of Colorado River water are currently scheduled to expire at the end of 2026. The Secretary, acting through Reclamation, proposes adoption of new guidelines and coordinated management strategies to address Lake Powell and Lake Mead through their full operating range, to be implemented upon the expiration of the existing guidelines and agreements. Management strategies will primarily focus on the operation of Glen Canyon Dam and Hoover Dam but may include actions upstream and downstream of these facilities to protect critical reservoir elevations.

Since the adoption of the current guidelines in 2007, unprecedented drought has changed the Basin's understanding of hydrology. Hydrologic conditions drier than those in the previously observed record have continued to occur, confounding ongoing efforts to manage system risk. This reality poses both near- and long-term challenges in managing the Colorado River system to continue to provide predictability and certainty to Basin water users as well as operating flexibility to conserve and enhance water storage in Colorado River system reservoirs.

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 general 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.

ES.5 Summary of Potential Effects

Table ES-7
Summary of Potential Effects of the Alternatives

Hydrology (See Section 3.3)

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Reservoir Elevations	Ranking of alternatives related to Lake Powell end of water year (EOWY) median elevations in the critically dry flow category.	**Ranked #6.** Lowest median elevations in the critcally dry flow category.	**Ranked #5**. Second lowest median elevations in the critcally dry flow category.	**Ranked #1.** Highest median elevations in the critcally dry flow category.	**Ranked #2.** Second highest median elevations in the critcally dry flow category.	**Tied Ranked #4.** Tied third lowest median elevations in the critcally dry flow category (same as Supply Driven Alternative [LB Pro Rata approach]).	**Tied Ranked #4.** Tied third lowest median elevations in the critcally dry flow category (same as Supply Driven Alternative [LB Priority approach]).	**Ranked #3.** Third highest median elevations in the critcally dry flow category.
	Percent of modeled futures in which *Lake Powell elevation stays above 3,500 feet 100% of the time*. The higher the percentage, the more likely Lake Powell will remain above the minimum power pool (3,490 feet) under most future hydrologic scenarios.	**4%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**19%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**81%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**94%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**35%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**35%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**58%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.
	Ranking of alternatives related to Lake Mead end of calendar year (EOCY) median elevations in the critically dry flow category.	**Ranked #7.** Lowest median elevations in the critcally dry flow category.	**Ranked #6.** Second lowest median elevations in the critcally dry flow category.	**Ranked #4.** Fourth lowest median elevations in the critcally dry flow category.	**Ranked #2**. Second highest median elevations in the critcally dry flow category.	**Ranked #3**. Third highest median elevations in the critcally dry flow category.	**Ranked #1**. Highest median elevations in the critcally dry flow category.	**Ranked #5.** Third lowest median elevations in the critcally dry flow category.
	Percent of futures in which *Lake Mead elevation stays above 975 feet 100% of the time*. The higher the percentage, the more likely Lake Mead will remain above the minimum power pool (950 feet) under most future hydrologic scenarios.	**32%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**62%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**74%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**77%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**69%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**81%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**72%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Reservoir Elevations *(continued)*	Lake Mohave and Lake Havasu end of year elevations.	No impact; the existing rule curves continue to determine elevations.						
System Storage	Ranking of alternatives related to Lake Powell + Lake Mead combined median storage capacity in all flow categories.	**Ranked #7.** Lowest combined storage in all flow categories.	**Ranked #6.** Second lowest combined storage in all flow categories.	**Ranked #1.** Highest combined storage in all flow categories.	**Ranked #2.** Second highest combined storage in all flow categories.	**Ranked #5.** Third lowest combined storage in all flow categories.	**Ranked #3.** Third highest combined storage in all flow categories.	**Ranked #4.** Fourth highest combined storage in all flow categories.
	Ranking of alternatives related to CRSP Reservoir (Flaming Gorge, Navajo, Blue Mesa, and Powell) combined median storage capacity in the two driest flow categories.	**Tied Ranked #4.** Tied second lowest combined storage in the driest flow categories (same as both Supply Driven Alternatives).	**Ranked #5.** Lowest combined storage in the driest flow categories.	**Ranked #1.** Highest combined storage in the driest flow categories.	**Ranked #2.** Second highest combined storage in the driest flow categories.	**Tied Ranked #4.** Tied second lowest combined storage in the driest flow categories. (same as Supply Driven Alternative [LB Pro Rata approach] and No Action).	**Tied Ranked #4.** Tied second lowest combined storage in the driest flow categories. (same as Supply Driven Alternative [LB Priority approach] and No Action).	**Ranked #3.** Third highest combined storage in the driest flow categories.
	Ranking of alternatives related to Seven-Reservoir (Flaming Gorge, Navajo, Blue Mesa, Powell, Mead, Mohave, and Havasu) combined median storage capacity in all flow categories.	**Ranked #7.** Lowest combined storage in all flow categories.	**Ranked #6.** Second lowest combined storage in all flow categories.	**Ranked #1.** Highest combined storage in the driest flow categories.	**Ranked #2.** Second highest combined storage in all flow categories	**Ranked #4.** Fourth highest combined storage in all flow categories	**Ranked #3.** Third highest combined storage in all flow categories.	**Ranked #5.** Third lowest combined storage in all flow categories.
Reservoir Releases	Annual Glen Canyon Dam EOWY releases under average and critically dry hydrology conditions (median values)	Releases of 8.23 maf in the average flow category. Releases of 6.36 maf the critically dry flow category.	Releases of 8.23 maf in the average flow category. Releases of 6.92 maf in the critically dry flow category.	Releases of 7.95 maf in the average flow category. Releases of 5.11 maf in the critically dry flow category.	Releases of 8.17 maf in the average flow category. Releases of 5.61 maf in the critically dry flow category.	Releases of 8.41 maf in the average flow category. Releases of 6.04 maf in the critically dry flow category.	Releases of 8.41 maf in the average flow category. Releases of 6.04 maf in the critically dry flow category.	Releases of 8.23 maf in the average flow category. Releases of 6.00 maf in the critically dry flow category.
	10-year Glen Canyon Dam releases under average and critically dry hydrology conditions (median values)	Releases of 80.8 maf in the average flow category. Releases of 74.3 maf Releases in the critically dry flow category.	Releases of 79.0 maf in the average flow category. Releases of 74.5 maf in the critically dry flow category.	Releases of 77.4 maf in the average flow category. Releases of 69.1 maf in the critically dry flow category.	Releases of 78.9 maf in the average flow category. Releases of 70.8 maf in the critically dry flow category.	Releases of 81.7 maf in the average flow category. Releases of 73.5 maf in the critically dry flow category.	Releases of 81.7 maf in the average flow category. Releases of 73.5 maf in the critically dry flow category.	Releases of 78.8 maf in the average flow category. Releases of 72.5 maf in the critically dry flow category.
	10-year Lee Ferry Compact Point flow volumes under average and critically dry hydrology conditions (median values)	Flows of 82.3 maf in the average flow category. Flows of 75.7 maf in the critically dry flow category.	Flows of 80.6 maf in the average flow category. Flows of 76.0 maf in the critically dry flow category.	Flows of 78.9 maf in the average flow category. Flows of 70.6 maf in the critically dry flow category.	Flows of 80.6 maf in the average flow category. Flows of 72.4 maf in the critically dry flow category.	Flows of 83.4 maf in the average flow category. Flows of 74.9 maf in the critically dry flow category.	Flows of 83.4 maf in the average flow category. Flows of 74.9 maf in the critically dry flow category.	Flows of 80.4 maf in the average flow category. Flows of 73.9 maf in the critically dry flow category

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Reservoir Releases *(continued)*	Annual EOCY Hoover Dam releases under critically dry hydrology conditions (median values)	Releases of 8.7 maf in the average flow category. Flows of 7.2 maf in the critically dry flow category.	Releases of 8.0 maf in the average flow category. Flows of 7.7 maf in the critically dry flow category.	Releases of 7.6 maf in the average flow category. Flows of 6.5 maf in the critically dry flow category.	Releases of 7.8 maf in the average flow category. Flows of 6.4 maf in the critically dry flow category.	Releases of 7.7 maf in the average flow category. Flows of 7.2 maf in the critically dry flow category.	Releases of 7.7 maf in the average flow category. Flows of 7.1 maf in the critically dry flow category.	Releases of 7.9 maf in the average flow category. Flows of 6.9 maf in the critically dry flow category.
	Annual EOCY Davis Dam releases under average and critically dry hydrology conditions (median values)	Releases of 8.5 maf in the average flow category. Releases of 7.1 maf in the critically dry flow category.	Releases of 7.9 maf in the average flow category. Releases of 7.6 maf in the critically dry flow category.	Releases of 7.4 maf in the average flow category. Releases of 6.4 maf in the critically dry flow category.	Releases of 7.6 maf in the average flow category. Releases of 6.3 maf in the critically dry flow category.	Releases of 7.6 maf in the average flow category. Releases of 7.1 maf in the critically dry flow category.	Releases of 7.5 maf in the average flow category. Releases of 7.0 maf in the critically dry flow category.	Releases of 7.8 maf in the average flow category. Releases of 6.9 maf in the critically dry flow category.
	Annual EOCY Parker Dam releases under average and critically dry hydrology conditions (median values)	Releases of 6.6 maf in the average flow category. Releases of 6.0 maf in the critically dry flow category.	Releases of 6.5 maf in the average flow category. Releases of 6.3 maf in the critically dry flow category.	Releases of 5.5 maf in the average flow category. Releases of 4.6 maf in the critically dry flow category.	Releases of 6.3 maf in the average flow category. Releases of 5.7 maf in the critically dry flow category.	Releases of 6.3 maf in the average flow category. Releases of 6.1 maf in the critically dry flow category.	Releases of 5.8 maf in the average flow category. Releases of 5.4 maf in the critically dry flow category.	Releases of 6.4 maf in the average flow category. Releases of 5.9 maf in the critically dry flow category.
	Ranking of alternatives related to median river flows in Reach 1 (Glen Canyon Dam to Lake Mead).	**Ranked #2.** Second highest median river flows in the critically dry flow category. Mirrors trends for releases from Glen Canyon Dam. River flows decrease as flow categories get drier.	**Ranked #1.** Highest median river flows in the critically dry flow category. Mirrors trends for releases from Glen Canyon Dam. River flows decrease as flow categories get drier.	**Ranked #6.** Lowest median river flows in the critically dry flow category. Mirrors trends for releases from Glen Canyon Dam. River flows decrease as flow categories get drier.	**Ranked #5.** Second lowest median river flows in the critically dry flow category. Mirrors trends for releases from Glen Canyon Dam. River flows decrease as flow categories get drier.	**Tied Ranked #3.** Tied third highest median river flows in the critically dry flow category (same as Supply Driven Alternative [LB Pro Rata]). Mirrors trends for releases from Glen Canyon Dam. River flows decrease as flow categories get drier.	**Tied Ranked #3.** Tied third median river flows in the critically dry flow category (same as Supply Driven Alternative [LB Priority]). Mirrors trends for releases from Glen Canyon Dam. River flows decrease as flow categories get drier.	**Ranked #4.** Third lowest median river flows in the critically dry flow category (same as No Action Alternative). Mirrors trends for releases from Glen Canyon Dam. River flows decrease as flow categories get drier.
River Flows	Ranking of alternatives related to median river flows in Reach 2 (Hoover Dam to Lake Mohave)	**Ranked #3.** Third highest median river flows in the critically dry flow category. Mirrors trends for distributes from Hoover Dam. River flows decrease as flow categories get drier.	**Ranked #1.** Highest median river flows in the critically dry flow category. Mirrors trends for releases from Hoover Dam. River flows decrease as flow categories get drier.	**Ranked #6.** Second lowest median river flows in the critically dry flow category. Mirrors trends for releases from Hoover Dam. River flows decrease as flow categories get drier.	**Ranked #7**. Lowest median river flows in the critically dry flow category. Mirrors trends for releases from Hoover Dam. River flows decrease as flow categories get drier.	**Ranked #2.** Second highest median river flows in the critically dry flow category. Mirrors trends for releases from Hoover Dam. River flows decrease as flow categories get drier.	**Ranked #4.** Fourth highest median river flows in the critically dry flow category. Mirrors trends for releases from Hoover Dam. River flows decrease as flow categories get drier.	**Ranked #5.** Third lowest median river flows in the critically dry flow category. Mirrors trends for releases from Hoover Dam. River flows decrease as flow categories get drier.
	Ranking of alternatives related to median river flows in Reach 3 (Davis Dam to Lake Havasu)	**Tied Ranked #2**. Tied second highest median river flows in the critically dry flow category (same as the Supply Driven Alternative [LB Priority]). Mirrors trends for releases from Davis Dam. River flows decrease as flow categories get drier.	**Ranked #1.** Highest median river flows in the critically dry flow category. Mirrors trends for releases from Davis Dam. River flows decrease as flow categories get drier.	**Ranked #5**. Second lowest median river flows in the critically dry flow category. Mirrors trends for releases from Davis Dam. River flows decrease as flow categories get drier.	**Ranked #6**. Lowest median river flows in the critically dry flow category. Mirrors trends for releases from Davis Dam. River flows decrease as flow categories get drier.	**Tied Ranked #2**. Tied second highest median river flows in the critically dry flow category (same as No Action Alternative). Mirrors trends for releases from Davis Dam. River flows decrease as flow categories get drier.	**Ranked #3**. Third highest median river flows in the critically dry flow category. Mirrors trends for releases from Davis Dam. River flows decrease as flow categories get drier.	**Ranked #4**. Third lowest median river flows in the critically dry flow category. Mirrors trends for releases from Davis Dam. River flows decrease as flow categories get drier.

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
River Flows *(continued)*	Ranking of alternatives related to median river flows in Reach 4 (Parker Dam to Cibola Gage)	**Ranked #3**. Third highest median river flows in the critically dry flow category. Mirrors trends for releases from Parker Dam. River flows decrease as flow categories get drier.	**Ranked #1.** Highest median river flows in the critically dry flow category. Mirrors trends for releases from Parker Dam. River flows decrease as flow categories get drier.	**Ranked #7**. Lowest median river flows in the critically dry flow category. Mirrors trends for releases from Parker Dam. River flows decrease as flow categories get drier.	**Ranked #5**. Third lowest median river flows in the critically dry flow category. Mirrors trends for releases from Parker Dam. River flows decrease as flow categories get drier.	**Ranked #2**. Second highest median river flows in the critically dry flow category. Mirrors trends for releases from Parker Dam. River flows decrease as flow categories get drier.	**Ranked #6**. Second lowest median river flows in the critically dry flow category. Mirrors trends for releases from Parker Dam. River flows decrease as flow categories get drier.	**Ranked #4**. Fourth highest median river flows in the critically dry flow category. Mirrors trends for releases from Parker Dam. River flows decrease as flow categories get drier.
	Ranking of alternatives related to median river flows in Reach 5 (Cibola Gage to Imperial Dam)	**Ranked #3**. Third highest median river flows in the critically dry flow category. Mirrors trends for river flows in Reach 4. River flows decrease as flow categories get drier.	**Ranked #1.** Highest median river flows in the critically dry flow category. Mirrors trends for river flows in Reach 4. River flows decrease as flow categories get drier.	**Ranked #7**. Lowest median flows in the critically dry flow category. Mirrors trends for river flows in Reach 4. River flows decrease as flow categories get drier.	**Ranked #5**. Third lowest median river flows in the critically dry flow category. Mirrors trends for river flows in Reach 4. River flows decrease as flow categories get drier.	**Ranked #2**. Second highest river flows in the critically dry flow category. Mirrors trends for river flows in Reach 4. River flows decrease as flow categories get drier.	**Ranked #6**. Second lowest median river flows in the critically dry flow category. Mirrors trends for river flows in Reach 4. River flows decrease as flow categories get drier.	**Ranked #4**. Fourth highest river flows in the critically dry flow category. Mirrors trends for river flows in Reach 4. River flows decrease as flow categories get drier.
	Ranking of alternatives related to median river flows in Reach 6 (Imperial Dam to Northerly International Boundary [NIB])	**Tied Ranked #3**. Tied third highest median river flows in critically dry flow category (same as Representative Preferred Alternative). Releases of 0.9 maf in the critically dry flow category.	**Ranked #1**. Highest river flows in critically dry flow category. Releases of 1.0 maf in the critically dry flow category.	**Ranked #6**. Lowest median river flows in critically dry flow category. Releases of 0.8 maf in the average flow category.	**Ranked #4**. Third lowest median river flows in critically dry flow categories. Releases of 0.8 maf in the critically dry flow category.	**Ranked #2**. Second highest river flows in critically dry flow category. Releases of 0.9 maf in the critically dry flow category.	**Ranked #5.** Second lowest median river flows in critically dry flow category. Releases of 1.0 maf in the critically dry flow category.	**Tied Ranked #3**. Tied third highest median river flows in all flow categories (same as No Action Alternative). Releases of 0.8 maf in the critically dry flow category.
	Likelihood for infrequent river flows to occur in wetter flow categories in Reach 7 (NIB to SIB, below Morelos)	Flows below Morelos Dam are infrequent under all flow categories. **Least likely** for infrequent flows to occur in the wetter flow categories.	Flows below Morelos Dam are infrequent under all flow categories. **Least likely** for infrequent flows to occur in the wetter flow categories.	Flows below Morelos Dam are infrequent under all flow categories. **Among the middle performing** for infrequent flows to occur in the wetter flow categories.	Flows below Morelos Dam are infrequent under all flow categories. **Among the middle performing** for infrequent flows to occur in the wetter flow categories.	Flows below Morelos Dam are infrequent under all flow categories. **Most likely** for infrequent flows to occur in the wet flow category.	Flows below Morelos Dam are infrequent under all flow categories. **Most likely** for infrequent flows to occur in the wet flow category.	Flows below Morelos Dam are infrequent under all flow categories. **Among the middle performing** for infrequent flows to occur in the wetter flow categories.
Groundwater	Groundwater in Reach 1 (Glen Canyon Dam to Lake Mead).	**Ranked #6**. Least robust at keeping elevations at Lake Powell above 3,500 feet; changes to groundwater levels adjacent to Lake Powell may be affected by changes in reservoir elevations. Groundwater elevations through Grand Canyon are not anticipated to be affected.	**Ranked #5**. Second least robust at keeping elevations at Lake Powell above 3,500 feet; changes to groundwater levels adjacent to Lake Powell may be affected by changes in reservoir elevations. Groundwater elevations through Grand Canyon are not anticipated to be affected.	**Ranked #2**. Second most robust at keeping elevations at Lake Powell above 3,500 feet; changes to groundwater levels adjacent to Lake Powell may be affected by changes in reservoir elevations. Groundwater elevations through Grand Canyon are not anticipated to be affected.	**Ranked #1**. Most robust at keeping elevations at Lake Powell above 3,500 feet; changes to groundwater levels adjacent to Lake Powell may be affected by changes in reservoir elevations. Groundwater elevations through Grand Canyon are not anticipated to be affected.	**Tied Ranked #3**. Tied third most robust at keeping elevations at Lake Powell above 3,500 feet; changes to groundwater levels adjacent to Lake Powell may be affected by changes in reservoir elevations. Groundwater elevations through Grand Canyon are not anticipated to be affected.	**Tied Ranked #3**. Tied third most robust at keeping elevations at Lake Powell above 3,500 feet; changes to groundwater levels adjacent to Lake Powell may be affected by changes in reservoir elevations. Groundwater elevations through Grand Canyon are not anticipated to be affected.	**Ranked #4**. Third least robust at keeping elevations at Lake Powell above 3,500 feet; changes to groundwater levels adjacent to Lake Powell may be affected by changes in reservoir elevations. Groundwater elevations through Grand Canyon are not anticipated to be affected.
	Groundwater in Reach 2 (Hoover Dam to Lake Mohave)	Groundwater elevations through this reach are not anticipated to be affected.						

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Groundwater *(continued)*	Groundwater in Reach 3 (Davis Dam to Lake Havasu)	**Tied Ranked #2.** Tied second highest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage. Groundwater elevations adjacent to Lake Havasu are not anticipated to be affected.	**Ranked #1**. Highest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage. Groundwater elevations adjacent to Lake Havasu are not anticipated to be affected.	**Ranked #5**. Second lowest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage. Groundwater elevations adjacent to Lake Havasu are not anticipated to be affected.	**Ranked #6**. Lowest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage. Groundwater elevations adjacent to Lake Havasu are not anticipated to be affected.	**Tied Ranked #2**. Tied second highest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage. Groundwater elevations adjacent to Lake Havasu are not anticipated to be affected.	**Ranked #3**. Third highest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage. Groundwater elevations adjacent to Lake Havasu are not anticipated to be affected.	**Ranked #4**. Third lowest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage. Groundwater elevations adjacent to Lake Havasu are not anticipated to be affected.
	Groundwater in Reach 4 (Parker Dam to Cibola Gage)	**Ranked #3**. Third highest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Ranked #1.** Highest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Ranked #7.** Lowest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Ranked #5.** Third lowest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Ranked #2.** Second highest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Ranked #6**. Second lowest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Ranked #4.** Fourth highest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.
	Groundwater in Reach 5 (Cibola Gage to Imperial Dam)	**Ranked #3.** Third highest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Ranked #1.** Highest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Ranked #7.** Lowest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Ranked #5.** Third lowest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Ranked #2.** Second highest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Ranked #6.** Second lowest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Ranked #4.** Fourth highest river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.
	Groundwater in Reach 6 (Imperial Dam to NIB)	Most of the river channel is bypassed with a series of canals and sluiceways. Groundwater elevations through this reach are not anticipated to be affected.						
	Groundwater in Reach 7 (NIB to SIB)	**Least likely** for infrequent flows to occur in this reach. Groundwater in the southern reach of the limitrophe may be affected by decreased flows.	**Least likely** for infrequent flows to occur in this reach. Groundwater in the southern reach of the limitrophe may be affected by decreased flows.	**Among the middle performing** for infrequent flows to occur in this reach. Groundwater in the southern reach of the limitrophe may be affected by decreased flows.	**Among the middle performing** for infrequent flows to occur in this reach. Groundwater in the southern reach of the limitrophe may be affected by decreased flows.	**Most likely** for infrequent flows to occur in this reach. Groundwater in the southern reach of the limitrophe may be affected by decreased flows.	**Most likely** for infrequent flows to occur in this reach. Groundwater in the southern reach of the limitrophe may be affected by decreased flows.	**Among the middle performing** for infrequent flows to occur in this reach. Groundwater in the southern reach of the limitrophe may be affected by decreased flows.

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

Water Deliveries (See Section 3.4)

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Apportionments	Upper Division States	No impact	No impact	No impact	No impact	No impact	No impact	No impact
	Lower Division States	Shortages are distributed based on priority.	Shortages are distributed based on priority.	Shortages are distributed based on pro rata.	Shortages are distributed priority based on Lower Division States' submission.	Shortages are distributed priority based on Lower DivisionD States' submission.	Shortages are distributed pro rata based on Lower DivisionD States' submission.	Shortages are distributed based on priority.
Lower Division States Water Supply Determinations and Total Water Deliveries[2]	Percent of modeled futures in which *dead pool-related reductions are avoided in 100% of years*. The higher the percentage, the more likely dead pool-related reductions are avoided.	**41%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**68%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**88%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**94%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**77%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**88%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**95%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.
	Effects of modeling assumptions for Upper and Lower Basin conservation activity (comparison of shortage and depletion results when turning conservation activity on and off).	Median reductions remain **similar** with conservation on or off.[3]	Median reductions remain **similar** with conservation on or off.[1]	Median shortages **slightly higher with conservation off** compared to conservation on in all flow categories. Median depletions **slightly lower with conservation off** in all flow categories.	Median shortages **slightly lower with conservation off** compared to conservation on in **wetter flow** categories **but higher or similar** in **drier flow** categories. Median depletions **slightly higher with** conservation **off** compared to conservation on in **wetter flow categories but slightly lower in drier flow categories**.	Median shortages **slightly lower with conservation off** compared to conservation on. Median depletions **slightly higher with conservation off** compared to conservation on.	Median shortages **slightly lower with conservation off** compared to conservation on. Median depletions **slightly higher with conservation off** compared to conservation on.	Median shortages **higher with conservation off** compared to conservation on. Median depletions **slightly lower with conservation off** compared to conservation on.

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

[2] Total shortage volumes and deliveries include assumptions related to reductions in water 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.

[3] While the No Action and Basic Coordination alternatives do not include mechanisms to conserve and store water in Lake Powell or Lake Mead, the model does include assumptions for the delivery of existing ICS that was conserved prior to 2027. In the conservation-off results, activity related to pre-2027 conservation is turned off for all the alternatives and the CCS Comparative Baseline. Refer to TA 4, Water Deliveries, for more details.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	**Basic Coordination Alternative**	**Enhanced Coordination Alternative**	**Maximum Operational Flexibility Alternative**	**Supply Driven Alternative (LB Priority)**	**Supply Driven Alternative (LB Pro Rata)**	**Representative Preferred Alternative**
Lower Division States Water Supply Determinations and Total Water Deliveries *(continued)*	Maximum shortage (maf) where shortage is any modeled reduction to the ability of an entitlement holder to exercise an entitlement as described in the assumptions of the model	Total Lower Basin: 0.60[4] Arizona: 0.47 California: 0.00 Nevada: 0.03	Total Lower Basin: 1.48[4] Arizona: 1.15 California: 0.00 Nevada: 0.08	Total Lower Basin: 3.00 Arizona: 0.93 California: 1.47 Nevada: 0.10	Total Lower Basin: 4.00 Arizona: 1.93 California: 1.28 Nevada: 0.20	Total Lower Basin: 2.10 Arizona: 1.22 California: 0.44 Nevada: 0.09	Total Lower Basin: 2.10 Arizona: 0.92 California: 0.76 Nevada: 0.07	Total Lower Basin: 3.6 Arizona: 1.96 California: 0.9 Nevada: 0.21
	Annual volume of Lower Basin shortage and dead pool-related reductions under critically dry hydrologic conditions (median values). Volumes are expressed as a total volume of reductions to the Lower Basin, including Mexico.	Median reductions increase as flow categories become drier. Shortage: 0.6 maf **Lowest** Dead pool-related reductions: 1.5 maf **Highest**	Median reductions increase as flow categories become drier. Shortage: 1.5 maf **Second lowest** Dead pool-related reductions: 0 maf **Tied lowest**	Median reductions increase as flow categories become drier. Shortage: 3.0 maf **Second highest** Dead pool-related reductions: 0 maf **Tied lowest**	Median reductions increase as flow categories become drier. Shortage: 3.1 maf **Highest** Dead pool-related reductions: 0 maf **Tied lowest**	Median reductions increase as flow categories become drier. Shortage: 2.0 maf **Third lowest** Dead pool-related reductions: 0 maf **Tied lowest**	Median reductions increase as flow categories become drier. Shortage: 1.9 maf **Third lowest** Dead pool-related reductions: 0 maf **Tied lowest**	Median reductions increase as flow categories become drier. Shortage: 2.1 maf **Third highest** Dead pool-related reductions: 0 maf **Tied lowest**
	Annual shortage by state under critically dry hydrology conditions (median values). Values are reported as percent of apportionment.	Arizona: 16.7%[4] **Lowest** California: 0% **Lowest** Nevada: 11% **Lowest**	Arizona: 41.1%[4] **Fourth highest** California: 0% **Lowest** Nevada: 27.2% **Fourth highest**	Arizona: 33.3% **Third lowest** California: 33.3% **Highest** Nevada: 33.3% **Third highest**	Arizona: 58.7% **Highest** California: 17.3% **Second highest** Nevada: 48.0% **Highest**	Arizona: 41.2% **Third highest** California: 10.0% **Second lowest** Nevada: 26.6% **Third lowest**	Arizona: 31.8% **Second lowest** California: 15.8% **Third lowest** Nevada: 22.0% **Second lowest**	Arizona: 53.1% **Second highest** California: 10.0% **Second lowest** Nevada: 36.3% **Second highest**
	Annual depletions (reported as percent of apportionment) by state under critically dry hydrology conditions (median values). Depletion is defined as total consumptive use (such as the amount of water diverted from the river) minus the return flow.	Arizona: 56.7% **Third lowest** California: 90.9% **Second highest** Nevada: 66.8% **Lowest**	Arizona: 58.9% **Second highest** California: 100% **Highest** Nevada: 83.3% **Second highest**	Arizona: 67.5% **Highest** California: 66.6% **Lowest** Nevada: 83.1% **Third highest**	Arizona: 42.5% **Lowest** California: 81.4% **Second lowest** Nevada: 69.8% **Second Lowest**	Arizona: 57.1% **Fourth highest** California 86.9% **Third highest** Nevada: 83.1% **Third highest**	Arizona: 58.2% **Third highest** California: 82.8% **Third lowest** Nevada: 86.6% **Highest**	Arizona: 51.8% **Second lowest** California: 86.0% **Fourth highest** Nevada: 73.3% **Third lowest**

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

[4] Note that these impacts are based on low maximum Lower Basin shortage volumes that translate to higher volumes of dead pool-related reductions (see **Figure TA 4-12**), which could result in significant but highly uncertain impacts.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Deliveries to Mexico	Annual delivery reduction under critically dry hydrology (median values). Values are reported as percent of allotment.	6.7%[4] **Lowest**	16.4%[4] **Second lowest**	33.3% **Second highest**	34.3% **Highest**	22.3% **Fourth highest**	22.0% **Third lowest**	23.6% **Third highest**
	Annual depletions under critically dry hydrology (median values). Values are reported as percent of allotment.	76.8% **Third Lowest**	83.6% **Highest**	67.4% **Second Lowest**	65.4% **Lowest**	78.3% **Fourth highest**	79.2% **Third highest**	81.5% **Second highest**
Lower Division States Combined Shortages	Shortage Allocation Model and Alternative Distribution Model estimated shortage impacts by water user type (Tribal, Domestic, and Non-Tribal Irrigation) under shortage conditions over a specified range of shortage volumes	Tribal:[4] 241 kaf Domestic: 277 kaf Non-Tribal Irrigation: 6 kaf	Tribal:[4] 241-489 kaf Domestic: 277-752 kaf Non-Tribal Irrigation: 6-34 kaf	Tribal: 76-378 kaf Domestic: 109-546 kaf Non-Tribal Irrigation: 316-1,578 kaf	Tribal: 209-582 kaf Domestic: 313-1,501 kaf Non-Tribal Irrigation: 2-1,211 kaf	Tribal: 209-510 kaf Domestic: 313-1,179 kaf Non-Tribal Irrigation: 2-88 kaf	Tribal: 139-357 kaf Domestic: 155-449 kaf Non-Tribal Irrigation: 206-944 kaf	<u>LB Priority 2027-2028</u> Tribal: 209-346 kaf Domestic: 313-858 kaf Non-Tribal Irrigation: 2-70 kaf <u>Priority (2029-later)</u> Tribal: 241-576 kaf Domestic: 277-1,472 kaf Non-Tribal Irrigation: 6-829 kaf

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

[4] Note that these impacts are based on low maximum Lower Basin shortage volumes that translate to higher volumes of dead pool-related reductions (see **Figure TA 4-12**), which could result in significant but highly uncertain impacts.

Geomorphology and Sediment (See Section 3.5)

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Water Availability	Percent of modeled futures in which *Lake Powell exceeds 3,500 feet in November or April (or both) in 100% of years*.	**19%** of modeled futures meet *the preferred minimum performance.*	**36%** of modeled futures meet *the preferred minimum performance.*	**88%** of modeled futures meet *the preferred minimum performance.*	**97%** of modeled futures meet *the preferred minimum performance.*	**46%** of modeled futures meet *the preferred minimum performance.*		**60%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which *Lake Powell exceeds 3,523 feet (the historical low elevation) in November or April (or both) in 100% of years*.	**3%** of modeled futures meet *the preferred minimum performance.*	**6%** of modeled futures meet *the preferred minimum performance.*	**29%** of modeled futures meet *the preferred minimum performance.*	**24%** of modeled futures meet *the preferred minimum performance.*	**12%** of modeled futures meet *the preferred minimum performance.*		**14%** of modeled futures meet *the preferred minimum performance.*
Sand Mass	Percent of modeled futures in which the *monthly Glen Canyon Dam releases are less than 900 kaf (approximately 15,000 cubic feet per second [cfs]) in at least 90% of months*. In other words, Glen Canyon Dam release rates are non-erosive in at least 90% of the simulation period.	**21%** of modeled futures meet *the preferred minimum performance.*	**50%** of modeled futures meet *the preferred minimum performance.*	**68%** of modeled futures meet *the preferred minimum performance.*	**39%** of modeled futures meet *the preferred minimum performance.*	**24%** of modeled futures meet *the preferred minimum performance.*		**41%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which the *sand mass in Marble Canyon exceeds 294,000 metric tons, the average transport capacity for a 60-hour duration high-flow experiment (HFE), in November or April at least once every four years*.	**78%** of modeled futures meet *the preferred minimum performance.*	**79%** of modeled futures meet *the preferred minimum performance.*	**79%** of modeled futures meet *the preferred minimum performance.*	**79%** of modeled futures meet *the preferred minimum performance.*	**77%** of modeled futures meet *the preferred minimum performance.*		**77%** of modeled futures meet *the preferred minimum performance.*
HFE Frequency and Duration	Percent of modeled futures in which *a spring or fall HFE of at least 60 hours occurs at least once every four years*.	**34%** of modeled futures meet *the preferred minimum performance.*	**54%** of modeled futures meet *the preferred minimum performance.*	**60%** of modeled futures meet *the preferred minimum performance.*	**64%** of modeled futures meet *the preferred minimum performance.*	**55%** of modeled futures meet *the preferred minimum performance.*		**55%** of modeled futures meet *the preferred minimum performance.*
Sandbar Volume	Percent of modeled futures in which *the maximum sediment year sandbar volume is greater than the sandbar volume at the start of the simulation period in at least 60% of years*. In other words, net sandbar growth is positive for at least 60% of the years.	**71%** of modeled futures meet *the preferred minimum performance.*	**85%** of modeled futures meet *the preferred minimum performance.*	**90%** of modeled futures meet *the preferred minimum performance.*	**90%** of modeled futures meet *the preferred minimum performance.*	**88%** of modeled futures meet *the preferred minimum performance.*		**85%** of modeled futures meet *the preferred minimum performance.*

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Sand Transport	Percent of modeled futures in which *the fraction of sand mass transported by sandbar-forming flow rates (above 37,000 cfs) is at least 0.4 (40% of the sand transport).*	**49%** of modeled futures meet *the preferred minimum performance.* Please note that this percentage is for the full modeling period. The sand load index data used for this performance indicator does not allow for subperiod modeling.	**74%** of modeled futures meet *the preferred minimum performance.* Please note that this percentage is for the full modeling period. The sand load index data used for this performance indicator does not allow for subperiod modeling.	**82%** of modeled futures meet *the preferred minimum performance.* Please note that this percentage is for the full modeling period. The sand load index data used for this performance indicator does not allow for subperiod modeling.	**82%** of modeled futures meet *the preferred minimum performance.* Please note that this percentage is for the full modeling period. The sand load index data used for this performance indicator does not allow for subperiod modeling.	**77%** of modeled futures meet *the preferred minimum performance.* Please note that this percentage is for the full modeling period. The sand load index data used for this performance indicator does not allow for subperiod modeling.		**76%** of modeled futures meet *the preferred minimum performance.* Please note that this percentage is for the full modeling period. The sand load index data used for this performance indicator does not allow for subperiod modeling.

Water Quality (See Section 3.6)

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
How would reservoir storage, reservoir releases, and corresponding changes in river flows downstream of the reservoirs affect projected **salinity**?	Percent of modeled futures in which *the salinity concentration below **Hoover Dam** is less than 723 milligrams per liter (mg/L) in 100% of years.*	**90%** of modeled futures meet *the preferred minimum performance.*	**95%** of modeled futures meet *the preferred minimum performance.*	**91%** of modeled futures meet *the preferred minimum performance.*	**94%** of modeled futures meet *the preferred minimum performance.*	**95%** of modeled futures meet *the preferred minimum performance.*	**96%** of modeled futures meet *the preferred minimum performance.*	**92%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which *the salinity concentration below **Parker Dam** is less than 747 mg/L in 100% of years.*	**90%** of modeled futures meet *the preferred minimum performance.*	**94%** of modeled futures meet *the preferred minimum performance.*	**84%** of modeled futures meet *the preferred minimum performance.*	**95%** of modeled futures meet *the preferred minimum performance.*	**96%** of modeled futures meet *the preferred minimum performance.*	**96%** of modeled futures meet *the preferred minimum performance.*	**94%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which *the salinity concentration **at Imperial** is less than 879 mg/L in 100% of years.*	**97%** of modeled futures meet *the preferred minimum performance.*	**97%** of modeled futures meet *the preferred minimum performance.*	**97%** of modeled futures meet *the preferred minimum performance.*	**98%** of modeled futures meet *the preferred minimum performance.*	**99%** of modeled futures meet *the preferred minimum performance.*	**99%** of modeled futures meet *the preferred minimum performance.*	**98%** of modeled futures meet *the preferred minimum performance.*
How would reservoir storage, reservoir releases, and corresponding changes in river flows downstream of the reservoirs affect projected **temperature**?	Annual average daily temperature of the Colorado River **at Lees Ferry** under critically dry flow category (median values)	13.8 degrees Celsius (°C; 56.8 degrees Fahrenheit [°F])	13.8 °C (56.8 °F)	12.9 °C (55.2 °F)	13.4 °C (56.1 °F)	13.7 °C (56.7 °F)	13.7 °C (56.7 °F)	14.1 °C (57.4 °F)
	Annual maximum daily temperature of the Colorado River **at Lees Ferry** under critically dry flow category (median values)	19.9 °C (67.8 °F)	19.7 °C (67.5 °F)	17.1 °C (62.8 °F)	18.1 °C (64.6 °F)	19 °C (66.2 °F)	19 °C (66.2 °F)	20.1 °C (68.2 °F)

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
How would reservoir storage, reservoir releases, and corresponding changes in river flows downstream of the reservoirs affect projected **temperature**? *(continued)*	Annual average daily temperature of the Colorado River **at Pearce Ferry** under critically dry flow category (median values)	16.7 °C (62.1 °F)	16.7 °C (62.1 °F)	16.6 °C (61.9 °F)	16.8 °C (62.2 °F)	16.8 °C (62.2 °F)	16.8 °C (62.2 °F)	17 °C (62.6 °F)
	Annual maximum daily temperature of the Colorado River **at Pearce Ferry** under critically dry flow category (median values)	23.3 °C (73.9 °F)	23.5 °C (74.3 °F)	23.3 °C (73.9 °F)	23.6 °C (74.5 °F)	23.6 °C (74.5 °F)	23.6 °C (74.5 °F)	23.8 °C (74.8 °F)
How would reservoir storage, reservoir releases, and corresponding changes in river flows downstream of the reservoirs affect projected **dissolved oxygen**?	Percent of modeled futures in which *Lake Powell reservoir elevations stay above 3,490 feet and minimum dissolved oxygen concentration is greater than 2mg/L from Glen Canyon Dam releases in at least 90% of years.*	**20%** of modeled futures meet *the preferred minimum performance.*	**25%** of modeled futures meet *the preferred minimum performance.*	**79%** of modeled futures meet *the preferred minimum performance.*	**76%** of modeled futures meet *the preferred minimum performance.*	**34%** of modeled futures meet *the preferred minimum performance.*	**34%** of modeled futures meet *the preferred minimum performance.*	**44%** of modeled futures meet *the preferred minimum performance.*
How would reservoir storage, reservoir releases, and corresponding changes in river flows downstream of the reservoirs affect **harmful algal blooms and nutrients**?	Qualitative comparison of water year minimum Lake Powell reservoir elevations under critically dry flow category (median values)	Water year minimum Lake Powell elevation median is the lowest, which would pose the **highest increased risk** for cyanobacterial blooms.	Water year minimum Lake Powell elevation median is the second lowest, which would pose **increased risk** for cyanobacterial blooms.	Water year minimum Lake Powell elevation median is highest, which would pose a **decreased risk** for cyanobacterial blooms.	Water year minimum Lake Powell elevation median is the second highest, which would pose a **decreased risk** for cyanobacterial blooms.	Water year minimum Lake Powell elevation median is third lowest compared with the other alternatives, which would pose an **increased risk** for cyanobacterial blooms compared with the Enhanced Coordination and Maximum Operational Flexibility alternatives, but a **decreased risk** compared with the No Action and Basic Coordination alternatives.		Water year minimum Lake Powell elevation median is third highest, which would pose a **decreased risk** for cyanobacterial blooms.
How would reservoir storage, reservoir releases, and corresponding changes in river flows downstream of the reservoirs affect **dilution capacity**?	Qualitative comparison of water year minimum Lake Powell reservoir elevations under critically dry flow category (median values)	Water year minimum Lake Powell elevation median is the lowest, which would pose the **greatest increased risk** of greater concentrations of pollutants of concern but it is unlikely that any of the reservoir elevations of the alternatives would substantially reduce the dilution capacity and increase the concentration of pollutants of concern.	Water year minimum Lake Powell elevation median is the lowest, which would pose an **increased risk** of greater concentrations of pollutants of concern but it is unlikely that any of the reservoir elevations of the alternatives would substantially reduce the dilution capacity and increase the concentration of pollutants of concern.	Water yea minimum Lake Powell elevation median is the highest, which would pose a **decreased risk** of greater concentrations of pollutants of concern but it is unlikely that any of the reservoir elevations of the alternatives would substantially reduce the dilution capacity and increase the concentration of pollutants of concern.	Water year minimum Lake Powell elevation median is the highest, which would pose a **decreased risk** of greater concentrations of pollutants of concern but it is unlikely that any of the reservoir elevations of the alternatives would substantially reduce the dilution capacity and increase the concentration of pollutants of concern.	Water year minimum Lake Powell elevation median is third lowest compared with the other alternatives, which would pose an **increased risk** of greater concentrations of pollutants of concern compared with the Enhanced Coordination and Maximum Operational Flexibility alternatives, but a decreased risk compared with the No Action and Basic Coordination alternatives. However, it is unlikely that any of the reservoir elevations of the alternatives would substantially reduce the dilution capacity and increase the concentration of pollutants of concern.		Water year minimum Lake Powell elevation median is third highest, which would pose a **decreased risk** of greater concentrations of pollutants of concern but it is unlikely that any of the reservoir elevations of the alternatives would substantially reduce the dilution capacity and increase the concentration of pollutants of concern.

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

Air Quality (See Section 3.7)

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred
Shoreline Area	Percent of modeled futures in which ***Lake Mead*** *shoreline exposure area stays below 500 square kilometers in every month*.	**54%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**75%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**88%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**93%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**81%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.		**92%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.
	Percent of modeled futures in which ***Lake Powell*** *shoreline exposure area stays below 500 square kilometers in every month*.	**25%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**45%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**87%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**98%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**46%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.		**66%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.
Shoreline Dust Emissions	Percent of modeled futures in which ***Lake Mead*** *shoreline dust emissions stay below 500 kilograms in every month*.	**34%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**64%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**79%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**84%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**72%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.		**74%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.
	Percent of modeled futures in which ***Lake Powell*** *shoreline dust emissions stay below 450 kilograms in every month*.	**14%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**37%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**84%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**96%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.	**43%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.		**59%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.
How would lake reservoir elevations and releases impact power generation and carbon dioxide equivalent (**CO_2e**) emissions?	Change in CO_2e emissions due to a loss of hydropower generation at **Glen Canyon Dam** under average hydrology conditions.	Hydropower generation would be highly affected resulting in the **tied most CO_2e emissions** under this alternative. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases.	Hydropower generation would be slightly less affected than under the Representative Preferred Alternative, resulting in the **third most CO_2e emissions** under this alternative. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases.	Hydropower generation would be least affected, resulting in the **tied lowest CO_2e emissions** under this alternative. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases.	Hydropower generation would be similar to that under the Enhanced Coordination Alternative, resulting in the **tied lowest CO_2e emissions** under this alternative. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases.	Hydropower generation would be the same as under the No Action Alternative, resulting in the **tied most CO_2e emissions** under this alternative. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases.		Hydropower generation would be slightly less affected than under the No Action Alternative, resulting in the **second most CO_2e emissions** under this alternative. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases.

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Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred
How would lake reservoir elevations and releases impact power generation and carbon dioxide equivalent (**CO_2e**) emissions? *(continued)*	Change in CO_2e emissions due to a loss of hydropower generation at **Hoover Dam** under average hydrology conditions.	Hydropower generation would be most affected resulting in the **most CO_2e emissions**, with potential decrease in CO_2e emissions. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases.	Hydropower generation would be less affected than under the No Action Alternative, resulting in the **second most CO_2e emissions** under this alternative. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases.	Hydropower generation would be similar to that under the Maximum Operational Flexibility Alternative.	Hydropower generation would be slightly more affected than under the Supply Driven Alternative, resulting in the **second lowest CO_2e emissions** under this alternative. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases.	Hydropower generation would be least affected, resulting in the **lowest CO_2e emissions**. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases. Hydropower generation would be the same between the two Supply Driven Alternatives with the Supply Driven (LB Pro Rata) having the **lowest CO_2e emissions**.		Hydropower generation would be similar to that under the Maximum Operational Flexibility Alternative.
	Change in CO_2e emissions due to a loss of hydropower generation at **Davis Dam** under average hydrology conditions.	Hydropower generation would be the least affected, resulting in the **lowest CO_2e emissions**. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases.	Hydropower generation would be slightly less affected than under the No Action Alternative, resulting in the **second lowest CO_2e emissions**. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases.	Hydropower generation would be highly affected, resulting in the **tied most CO_2e emissions**. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases.	Hydropower generation would be similar to that under the Enhanced Coordination Alternative, resulting in the **tied most CO_2e emissions**. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases.	Hydropower generation would be similar to that under the Enhanced Coordination Alternative. Hydropower generation would be similar between the two Supply Driven Alternatives with the Supply Driven (LB Pro Rata) having the **highest CO_2e emissions**.		Hydropower generation would be slightly less affected than under the Basic Coordination Alternative, resulting in the **third lowest CO_2e emissions**. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases.
	Change in CO_2e emissions due to a loss of hydropower generation at **Parker Dam** under average hydrology conditions.	Hydropower generation would be the least affected, resulting in the **tied least CO_2e emissions**. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases.	Hydropower generation would be similar to that under the No Action Alternative, resulting in the **tied least CO_2e emissions**. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases.	Hydropower generation would be highly affected, resulting in the **most CO_2e emissions**. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases.	Hydropower generation would be slightly more affected than under the Representative Preferred Alternative, resulting in the **third least CO_2e emissions**. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases.	Under the Supply Driven Alternative (LB Priority approach), hydropower generation would be similar to that under the Maximum Flexibility Alternative. Under the Supply Driven Alternative (LB Pro Rata approach), hydropower generation would be highly affected, resulting in the **second most CO_2e emissions**. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases.		Hydropower generation would be slightly more affected than under the No Action Alternative, resulting in the **second least CO_2e emissions**. This is due to the inverse correlation between CO_2e emissions from alternative energy sources and generation from reservoir elevations and releases.

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Aquatic Resources (See Section 3.8)

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Lake Powell elevations	Percent of modeled futures in which *Lake Powell elevation is below 3,598 feet at least 70% of months*, meaning critical habitat of Colorado Pikeminnow and Razorback Sucker is riverine (lotic) in the Colorado River Inflow.	**52%** of modeled futures meet *the preferred minimum performance.*	**49%** of modeled futures meet *the preferred minimum performance.*	**28%** of modeled futures meet *the preferred minimum performance.*	**27%** of modeled futures meet *the preferred minimum performance.*	**53%** of modeled futures meet *the preferred minimum performance.*	**53%** of modeled futures meet *the preferred minimum performance.*	**40%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which *Lake Powell elevation is below 3,600 feet at least 70% of months*, meaning critical habitat of Colorado Pikeminnow and Razorback Sucker is riverine (lotic) in the San Juan River Inflow.	**52%** of modeled futures meet *the preferred minimum performance.*	**50%** of modeled futures meet *the preferred minimum performance.*	**29%** of modeled futures meet *the preferred minimum performance.*	**29%** of modeled futures meet *the preferred minimum performance.*	**54%** of modeled futures meet *the preferred minimum performance.*	**54%** of modeled futures meet *the preferred minimum performance.*	**42%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which *Lake Powell elevation is below 3,666.5 feet in 100% of months, meaning the Paiute Farms Waterfall remains a barrier to upstream fish passage.*	**56%** of modeled futures meet *the preferred minimum performance.*	**56%** of modeled futures meet *the preferred minimum performance.*	**44%** of modeled futures meet *the preferred minimum performance.*	**38%** of modeled futures meet *the preferred minimum performance.*	**62%** of modeled futures meet *the preferred minimum performance.*	**62%** of modeled futures meet *the preferred minimum performance.*	**50%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which *October 1 Lake Powell elevation is above 3,570 feet at least 70% of years,* meaning the risk of smallmouth bass entrainment is reduced.	**33%** of modeled futures meet *the preferred minimum performance.*	**39%** of modeled futures meet *the preferred minimum performance.*	**62%** of modeled futures meet *the preferred minimum performance.*	**60%** of modeled futures meet *the preferred minimum performance.*	**35%** of modeled futures meet *the preferred minimum performance.*	**35%** of modeled futures meet *the preferred minimum performance.*	**42%** of modeled futures meet *the preferred minimum performance.*

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Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Water Temperature	Percent of modeled futures in which *water temperature at Lees Ferry (river mile [RM] 0) never exceeds 20°C.*	**19%** of modeled futures meet *the preferred minimum performance.*	**32%** of modeled futures meet *the preferred minimum performance.*	**62%** of modeled futures meet *the preferred minimum performance.*	**60%** of modeled futures meet *the preferred minimum performance.*	**30%** of modeled futures meet *the preferred minimum performance.*	**30%** of modeled futures meet *the preferred minimum performance.*	**36%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which *water temperature at the Little Colorado River Confluence (RM 62) exceeds 12°C ≥110 days in 90% of years.*	**52%** of modeled futures meet *the preferred minimum performance.*	**50%** of modeled futures meet *the preferred minimum performance.*	**36%** of modeled futures meet *the preferred minimum performance.*	**31%** of modeled futures meet *the preferred minimum performance.*	**58%** of modeled futures meet *the preferred minimum performance.*	**58%** of modeled futures meet *the preferred minimum performance.*	**44%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which *water temperature at the Little Colorado River Confluence (RM 62) exceeds 16°C ≥110 days in 90% of years.*	**1%** of modeled futures meet *the preferred minimum performance.*	**2%** of modeled futures meet *the preferred minimum performance.*	**4%** of modeled futures meet *the preferred minimum performance.*	**4%** of modeled futures meet *the preferred minimum performance.*	**5%** of modeled futures meet *the preferred minimum performance.*	**5%** of modeled futures meet *the preferred minimum performance.*	**6%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which *water temperature at the Havasu Creek Confluence (RM 157.2) exceeds 12°C ≥110 days in 90% of years.*	**91%** of modeled futures meet *the preferred minimum performance.*	**92%** of modeled futures meet *the preferred minimum performance.*	**90%** of modeled futures meet *the preferred minimum performance.*	**89%** of modeled futures meet *the preferred minimum performance.*	**93%** of modeled futures meet *the preferred minimum performance.*	**93%** of modeled futures meet *the preferred minimum performance.*	**93%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which *water temperature at the Havasu Creek Confluence (RM 157.2) exceeds 16°C ≥110 days in 90% of years.*	**43%** of modeled futures meet *the preferred minimum performance.*	**35%** of modeled futures meet *the preferred minimum performance.*	**16%** of modeled futures meet *the preferred minimum performance.*	**16%** of modeled futures meet *the preferred minimum performance.*	**38%** of modeled futures meet *the preferred minimum performance.*	**38%** of modeled futures meet *the preferred minimum performance.*	**25%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which *water temperature at Pearce Ferry (RM 281) exceeds 12°C ≥110 days in 90% of years.*	**100%** of modeled futures meet *the preferred minimum performance.*	**100%** of modeled futures meet *the preferred minimum performance.*	**100%** of modeled futures meet *the preferred minimum performance.*	**100%** of modeled futures meet *the preferred minimum performance.*	**100%** of modeled futures meet *the preferred minimum performance.*	**100%** of modeled futures meet *the preferred minimum performance.*	**100%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which *water temperature at Pearce Ferry (RM 281) exceeds 16°C ≥110 days in 90% of years.*	**73%** of modeled futures meet *the preferred minimum performance.*	**72%** of modeled futures meet *the preferred minimum performance.*	**51%** of modeled futures meet *the preferred minimum performance.*	**56%** of modeled futures meet *the preferred minimum performance.*	**66%** of modeled futures meet *the preferred minimum performance.*	**66%** of modeled futures meet *the preferred minimum performance.*	**58%** of modeled futures meet *the preferred minimum performance.*
Smallmouth population growth	Percent of modeled futures in which *the 5-year Smallmouth Bass growth rate (lambda) at Lees Ferry is always less than 1.*	**6%** of modeled futures meet *the preferred minimum performance.*	**21%** of modeled futures meet *the preferred minimum performance.*	**47%** of modeled futures meet *the preferred minimum performance.*	**44%** of modeled futures meet *the preferred minimum performance.*	**25%** of modeled futures meet *the preferred minimum performance.*	**25%** of modeled futures meet *the preferred minimum performance.*	**30%** of modeled futures meet *the preferred minimum performance.*

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Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Smallmouth bass entrainment	Percent of modeled futures in which *the annual count of adult smallmouth bass that are entrained and survive is always less than 50 individuals.*	**0%** of modeled futures meet *the preferred minimum performance.*	**2%** of modeled futures meet *the preferred minimum performance.*	**26%** of modeled futures meet *the preferred minimum performance.*	**24%** of modeled futures meet *the preferred minimum performance.*	**4%** of modeled futures meet *the preferred minimum performance.*	**4%** of modeled futures meet *the preferred minimum performance.*	**6%** of modeled futures meet *the preferred minimum performance.*
Lake Mead elevation	Percent of modeled futures in which *Lake Mead elevation is above the historical minimum elevation of 1,040.92 feet ≥90% of months.*	**4%** of modeled futures meet *the preferred minimum performance.*	**11%** of modeled futures meet *the preferred minimum performance.*	**14%** of modeled futures meet *the preferred minimum performance.*	**17%** of modeled futures meet *the preferred minimum performance.*	**21%** of modeled futures meet *the preferred minimum performance.*	**27%** of modeled futures meet *the preferred minimum performance.*	**17%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which *Colorado River water levels at Pearce Ferry Rapid are below 1,090 Feet ≥90% of months.*	**78%** of modeled futures meet *the preferred minimum performance.*	**59%** of modeled futures meet *the preferred minimum performance.*	**31%** of modeled futures meet *the preferred minimum performance.*	**38%** of modeled futures meet *the preferred minimum performance.*	**30%** of modeled futures meet *the preferred minimum performance.*	**20%** of modeled futures meet *the preferred minimum performance.*	**39%** of modeled futures meet *the preferred minimum performance.*
Hoover Dam releases	Percent of modeled futures in which *monthly releases from Hoover Dam are within the range observed during 2008–2025, in 100% of months.*	**88%** of modeled futures meet *the preferred minimum performance.*	**82%** of modeled futures meet *the preferred minimum performance.*	**47%** of modeled futures meet *the preferred minimum performance.*	**32%** of modeled futures meet *the preferred minimum performance.*	**64%** of modeled futures meet *the preferred minimum performance.*	**61%** of modeled futures meet *the preferred minimum performance.*	**41%** of modeled futures meet *the preferred minimum performance.*

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Vegetation Including Special Status Species (See Section 3.9)

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Vegetation, including special status plant species	Marsh habitat (Lake Powell, Lake Mead, and Hoover Dam to SIB Reaches) – Changes in water fluctuations within a single year compared to historical conditions.	The No Action Alternative is **among the middle performing** alternative for the Lake Powell reach because the annual variability is neither the most similar nor the least similar to historic conditions for these reaches. The No Action Alternative is **among the best performing** alternatives for the Hoover Dam to SIB reaches because it has annual variability similar to historic conditions. The No Action Alternative is **among the least performing** alternatives for the Lake Mead reach because its annual variability is least like historic conditions.	The Basic Coordination Alternative is **among the middle performing** alternatives for the Lake Powell reach because is neither the most similar nor the least similar to historic conditions for these reaches. The Basic Coordination Alternative is **among the best performing** alternatives for the Lake Mead and Hoover Dam to SIB reaches because it has annual variability similar to historic conditions.	The Enhanced Coordination Alternative is **among the best performing** alternatives for the Lake Powell reach because it has annual variability similar to historic conditions. The Enhanced Coordination Alternative is **among the least performing** alternatives for the Lake Mead and Hoover Dam to SIB reach because its annual variability is least like historic conditions.	The Maximum Operational Flexibility Alternative is **among the best performing** alternatives for the Lake Powell, Lake Mead, and Hoover Dam to the SIB reaches because it has annual variability similar to historic conditions.	The Supply Driven Alternative is **among the best performing** alternative for the Hoover Dam to SIB reach because it has annual variability similar to historic conditions. The Supply Driven Alternative is **among the middle performing** alternative for the Lake Mead reach because the annual variability is neither the most similar nor the least similar to historic conditions for these reaches. The Supply Driven Alternative is **among the least performing** alternatives for Lake Powell because its annual variability is least like historic conditions.		The Representative Preferred Alternative is **among the middle performing** alternatives for the Lake Powell and Lake Mead reaches because is neither the most similar nor the least similar to historic conditions for these reaches in the first decade. The Representative Preferred Alternative is **among the least performing** alternatives for the Hoover Dam to the SIB because its annual variability is least like historic conditions in the first decade. Considering all modeled natural flow conditions, no Alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach.
	Woody riparian habitat (Lake Powell, Lake Mead, and Hoover Dam to SIB Reaches) – Changes in water fluctuations in the preceding 5 years compared to historical conditions.	The No Action Alternative is **among the middle performing** alternative for the Lake Powell, Lake Mead, and Hoover Dam to SIB reaches because the annual variability is neither the most similar nor the least similar to historic conditions for these reaches.	The Basic Coordination Alternative is **among the middle performing** alternative for the Lake Powell because the annual variability is neither the most similar nor the least similar to historic conditions for this reach. The Basic Coordination Alternative is **among the best performing** alternatives for the Lake Mead and Hoover Dam to SIB reaches because it has annual variability similar to historic conditions.	The Enhanced Coordination Alternative is **among the best performing** alternatives for the Lake Powell reach because it has annual variability similar to historic conditions. The Enhanced Coordination Alternative is **among the least performing** alternatives for Lake Mead and the Hoover Dam to SIB reach because its annual variability is least like historic conditions.	The Maximum Operational Flexibility Alternative is **among the middle performing** alternatives for the Lake Powell reach because it has annual variability similar to historic conditions. The Maximum Operational Flexibility Alternative is **among the best performing** alternatives for the Lake Mead reach because it has annual variability similar to historic conditions. The Maximum Operational Flexibility Alternative is **among the least performing** alternatives for the Hoover Dam to SIB reach because its annual variability is least like historic conditions.	The Supply Driven Alternative is **never the best performing** alternative because it never has variability most similar to historic conditions. The Supply Driven Alternative is **among the middle performing** alternative for the Lake Mead and Hoover Dam to SIB reaches because the annual variability is neither the most similar nor the least similar to historic conditions for these reaches. The Supply Driven Alternative is **among the least performing** alternatives for the Lake Powell reach because its annual variability is least like historic conditions.		The Representative Preferred Alternative is **among the middle performing** alternatives for all reaches because the annual variability is neither the most similar nor the least similar to historic conditions for these reaches. Considering all modeled natural flow conditions, no Alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach.

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Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	**Basic Coordination Alternative**	**Enhanced Coordination Alternative**	**Maximum Operational Flexibility Alternative**	**Supply Driven Alternative (LB Priority)**	**Supply Driven Alternative (LB Pro Rata)**	**Representative Preferred Alternative**
Vegetation, including special status plant species *(continued)*	Upland habitat (Lake Powell, Lake Mead, and Hoover Dam to SIB Reaches) – Changes in water fluctuations in either the preceding single year or preceding 5 years compared to historical conditions.	Upland habitat would be gained or lost depending on whether conditions are suitable for marsh or woody riparian habitat (see above).						
	Marsh habitat suitable area (Glen Canyon Dam to Lake Mead Reach) - A change from the median and interquartile ranges from modeled historic conditions	Considering all modeled natural flow conditions, no alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach. Across all sub-reaches, there is a general trend of less suitable habitat area for marsh vegetation under wetter conditions and more suitable habitat area under drier conditions compared to modeled historic conditions.						
	Woody Riparian habitat suitable area (Glen Canyon Dam to Lake Mead Reach) - A change from the median and interquartile ranges from modeled historic conditions.	Considering all modeled natural flow conditions, no alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach. Across all sub-reaches, there is a general trend of less suitable habitat area for woody riparian vegetation under wetter conditions and more suitable habitat area under drier conditions compared to modeled historic conditions.						
	Upland habitat suitable area	Upland habitat would be gained or lost depending on whether conditions are suitable for marsh or woody riparian habitat (see above).						
	Native Species Richness (Glen Canyon Dam to Lake Mead Reach) - A change from the median and interquartile ranges from modeled historic conditions.	Considering all modeled natural flow conditions and sub-reaches, no alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach. All alternatives show decreased native species richness compared to modeled historic conditions under all flow conditions.						
	Proportion Native Species Cover (Glen Canyon Dam to Lake Mead Reach) - A change from the median and interquartile ranges from modeled historic conditions.	Considering all modeled natural flow conditions, no alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach. Across all sub-reaches, there is a general trend of less proportion of native species cover under wetter conditions and more proportion of native species cover under drier conditions compared to modeled historic conditions.						

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Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Vegetation, including special status plant species *(continued)*	Annual Total Vegetation Cover (Glen Canyon Dam to Lake Mead Reach) - A change from the median and interquartile ranges from modeled historic conditions.	Considering all modeled natural flow conditions, no alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach. Across all sub-reaches, there is a general trend of less annual total vegetation cover under wetter conditions and more annual total vegetation cover under drier conditions compared to modeled historic conditions.						

Terrestrial Wildlife Including Special Status Species (See Section 3.10)

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Terrestrial wildlife species habitat availability, including for special status species	Terrestrial wildlife species using marsh habitat – Changes in water fluctuations within a single year compared to historical conditions.	The No Action Alternative is **among the middle performing** alternative for the Lake Powell reach because the annual variability is neither the most similar nor the least similar to historic conditions for these reaches. The No Action Alternative is **among the best performing** alternatives for the Hoover Dam to SIB reaches because it has annual variability similar to historic conditions. The No Action Alternative is **among the least performing** alternatives for the Lake Mead reach because its annual variability is least like historic conditions. Considering all modeled natural flow conditions, no Alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach.	The Basic Coordination Alternative is **among the middle performing** alternatives for the Lake Powell reach because is neither the most similar nor the least similar to historic conditions for these reaches. The Basic Coordination Alternative is **among the best performing** alternatives for the Lake Mead and Hoover Dam to SIB reaches because it has annual variability similar to historic conditions. Considering all modeled natural flow conditions, no Alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach.	The Enhanced Coordination Alternative is **among the best performing** alternatives for the Lake Powell reach because it has annual variability similar to historic conditions. The Enhanced Coordination Alternative is **among the least performing** alternatives for the Lake Mead and Hoover Dam to SIB reach because its annual variability is least like historic conditions. Considering all modeled natural flow conditions, no Alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach.	The Maximum Operational Flexibility Alternative is **among the best performing** alternatives for the Lake Powell, Lake Mead, and Hoover Dam to the SIB reaches because it has annual variability similar to historic conditions. Considering all modeled natural flow conditions, no Alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach.	The Supply Driven Alternative is **among the best performing** alternative for the Hoover Dam to SIB reach because it has annual variability similar to historic conditions. The Supply Driven Alternative is **among the middle performing** alternative for the Lake Mead reach because the annual variability is neither the most similar nor the least similar to historic conditions for these reaches. The Supply Driven Alternative is **among the least performing** alternatives for Lake Powell because its annual variability is least like historic conditions. Considering all modeled natural flow conditions, no Alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach.		The Representative Preferred Alternative is **among the middle performing** alternatives for the Lake Powell and Lake Mead reaches because is neither the most similar nor the least similar to historic conditions for these reaches in the first decade. The Representative Preferred Alternative is **among the least performing** alternatives for the Hoover Dam to the SIB because its annual variability is least like historic conditions in the first decade. Considering all modeled natural flow conditions, no Alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach.

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Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Terrestrial wildlife species habitat availability, including for special status species *(continued)*	Terrestrial wildlife species using woody riparian habitat – Changes in water fluctuations in the preceding 5 years compared to historical conditions.	The No Action Alternative is **among the middle performing** alternative for the Lake Powell, Lake Mead, and Hoover Dam to SIB reaches because the annual variability is neither the most similar nor the least similar to historic conditions for these reaches. Considering all modeled natural flow conditions, no Alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach.	The Basic Coordination Alternative is **among the middle performing** alternative for the Lake Powell because the annual variability is neither the most similar nor the least similar to historic conditions for this reach. The Basic Coordination Alternative is **among the best performing** alternatives for the Lake Mead and Hoover Dam to SIB reaches because it has annual variability similar to historic conditions. Considering all modeled natural flow conditions, no Alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach.	The Enhanced Coordination Alternative is **among the best performing** alternatives for the Lake Powell reach because it has annual variability similar to historic conditions. The Enhanced Coordination Alternative is **among the least performing** alternatives for Lake Mead and the Hoover Dam to SIB reach because its annual variability is least like historic conditions. Considering all modeled natural flow conditions, no Alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach.	The Maximum Operational Flexibility Alternative is **among the middle performing** alternatives for the Lake Powell reach because it has annual variability similar to historic conditions. The Maximum Operational Flexibility Alternative is **among the best performing** alternatives for the Lake Mead reach because it has annual variability similar to historic conditions. The Maximum Operational Flexibility Alternative is **among the least performing** alternatives for the Hoover Dam to SIB reach because its annual variability is least like historic conditions. Considering all modeled natural flow conditions, no Alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach.	The Supply Driven Alternative is **never the best performing** alternative because it never has variability most similar to historic conditions. The Supply Driven Alternative is **among the middle performing** alternative for the Lake Mead and Hoover Dam to SIB reaches because the annual variability is neither the most similar nor the least similar to historic conditions for these reaches. The Supply Driven Alternative is **among the least performing** alternatives for the Lake Powell reach because its annual variability is least like historic conditions. Considering all modeled natural flow conditions, no Alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach.		The Representative Preferred Alternative is **among the middle performing** alternatives for all reaches because the annual variability is neither the most similar nor the least similar to historic conditions for these reaches. Considering all modeled natural flow conditions, no Alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach.
	Terrestrial wildlife species using upland habitat – Changes in water fluctuations in either the preceding single year or preceding 5 years compared to historical conditions.	Upland habitat would be gained or lost depending on whether conditions are suitable for marsh or woody riparian habitat (see above).						

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

Cultural Resources (See Section 3.11)

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Projected end-of-year lake elevations that may expose cultural resources to damage from wave action, wet/dry cycling, or increased ease of access	Projected end-of-year lake elevations for Lake Powell (EOWY) and Lake Mead (EOCY) and number of cultural resources potentially impacted	Lake Powell: Under average conditions, median water levels fall below 3,550 feet exposing at least 316 archaeological sites. Under critically dry conditions, median water levels drop below 3,440 feet, potentially leaving the most sites exposed with at least 415 sites exposed. Lake Mead: During average hydrologic conditions, median elevations are around 990below 980 feet potentially exposing at least 301 known sites. In critically dry conditions, all 310 sites would likely be exposed due to low reservoir elevations.	Lake Powell: Under average conditions, median water levels fall below 3,570 feet exposing at least 316 archaeological sites. Under critically dry conditions, median water levels drop below 3,490 feet with at least 415 sites exposed. Lake Mead: During average hydrological conditions, median elevations are around or below 1,060 feet exposing at least 280 sites. In critically dry conditions, median elevations drop below 980 feet, exposing at least 296 sites would likely be exposed.	Lake Powell: Under average conditions, median water levels drop to around 3,610 feet, leaving at more than 138 sites exposed. Under critically dry conditions, median water levels drop below 3,560 feet, potentially leaving at least 316 sites exposed. Lake Mead: Under average conditions, median elevations are around 1,110 feet exposing up to at least 265 sites. In critically dry conditions, all 310 sites could be exposed due to low reservoir elevations.	Lake Powell: Under average conditions, median water levels drop to around 3,600 feet, leaving at least 197 sites exposed. Under critically dry conditions, median water levels drop below 3,550 feet, potentially leaving at least 316 site exposed. Lake Mead: Under average conditions, median elevations are around or below 1,130 feet exposing up to at least 245 sites. Under critically dry conditions, median elevations are around 1,000 feet leaving at least 296 sites exposed.	Lake Powell: Under average conditions, median elevations are around 3,580 feet leaving at least 280 sites exposed. Under critically dry conditions, median water levels drop below 3,490 feet, potentially leaving the most sites exposed with at least 415 sites exposed. Lake Mead: During average conditions, median elevations are around or below 1,150 feet exposing at least 227 known sites. Under critically dry conditions, minimum elevations are below 1,030 feet and could potentially expose at least 291 sites. .		Lake Powell: Under average conditions, median elevations are just below 3,600 feet leaving at least 249 sites exposed. Under critically dry conditions, median water levels drop below 3,510 feet, potentially leaving the most sites exposed with at least 316 sites exposed. Lake Mead: During average conditions, median elevations are around or below 1,100 feet exposing at least 265 known sites. Under critically dry conditions, minimum elevations are below 990 feet and could potentially expose at least 296 sites.
	Lake Powell: Percent of modeled futures for the first decadal period (2027–2039) in which *the preservation risk at Lake Powell is below 2.72 in at least 90% of months* Lake Mead: Percent of modeled futures for the first decadal period (2027–2039) in which *the preservation risk at Lake Mead is below 2.24 in at least 90% of months*	Lake Powell: **12%** of modeled futures meet *the preferred minimum performance*. Lake Mead: **1%** of modeled futures meet *the preferred minimum performance*.	Lake Powell: **14%** of modeled futures meet *the preferred minimum performance*. Lake Mead: **2%** of modeled futures meet *the preferred minimum performance*.	Lake Powell: **30%** of modeled futures meet *the preferred minimum performance*. Lake Mead: **2%** of modeled futures meet *the preferred minimum performance*.	Lake Powell: **25%** of modeled futures meet *the preferred minimum performance*. Lake Mead: **3%** of modeled futures meet *the preferred minimum performance*.	Lake Powell: **12%** of modeled futures meet *the preferred minimum performance*. Lake Mead: **5%** of modeled futures meet *the preferred minimum performance*.		Lake Powell: **16%** of modeled futures meet *the preferred minimum performance*. Lake Mead: **3%** of modeled futures meet *the preferred minimum performance*.

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Projected changes in river flows that may contribute to erosion and exposure of cultural resources that may expose sites to damage from erosion, wet/dry cycling, or increased ease of access	Projected releases from dams and forecasted river flow volumes that are outside past releases or flows	Under average hydrologic conditions, releases fall within past volumes for the Glen Canyon Dam to Lake Mead reach and Hoover Dam to Lake Mohave. During critically dry conditions, release volumes may drop below past releases; however, impacts would only be for sites close to riverbank. No impacts below Lake Mohave.	Under average hydrologic conditions, releases fall within past volumes for the Glen Canyon Dam to Lake Mead reach and Hoover Dam to Lake Mohave. During critically dry conditions, release volumes may drop below past releases; however, impacts would only be for sites close to riverbank. No impacts below Lake Mohave.	Under average hydrologic conditions, releases fall within past volumes for the Glen Canyon Dam to Lake Mead reach and Hoover Dam to Lake Mohave. During critically dry conditions, release volumes may drop below past releases; however, impacts would only be for sites close to riverbank. No impacts below Lake Mohave.	Under average hydrologic conditions, releases fall within past volumes for the Glen Canyon Dam to Lake Mead reach and Hoover Dam to Lake Mohave. During critically dry conditions, release volumes may drop below past releases; however, impacts would only be for sites close to riverbank. No impacts below Lake Mohave.	Under average hydrologic conditions, releases fall within past volumes for the Glen Canyon Dam to Lake Mead reach and Hoover Dam to Lake Mohave. During critically dry conditions, release volumes may drop below past releases; however, impacts would only be for sites close to riverbank. No impacts below Lake Mohave.		Under average hydrologic conditions, releases fall within past volumes for the Glen Canyon Dam to Lake Mead reach and Hoover Dam to Lake Mohave. During critically dry conditions, release volumes may drop below past releases; however, impacts would only be for sites close to riverbank. No impacts below Lake Mohave.
Projected availability of sediments along the river which may be transported by wind and deposited on archaeological sites	Percent of modeled futures for the first decadal period (2027-2039) in which *annual sand area >50th and vegetation cover <50th percentile or sandbar volume >1.5 initial condition at least one out of every 3 years*	**38%** of modeled futures meet *the preferred minimum performance.*	**19%** of modeled futures meet *the preferred minimum performance.*	**35%** of modeled futures meet *the preferred minimum performance.*	**30%** of modeled futures meet *the preferred minimum performance.*	**9%** of modeled futures meet *the preferred minimum performance.*	**9%** of modeled futures meet *the preferred minimum performance.*	**17%** of modeled futures meet *the preferred minimum performance.*

Paleontological Resources (See Section 3.12)

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Paleontological preservation risk due to dam operations	Percent of modeled futures for the first decadal period (2027–2039) in which *monthly preservation risk rank at **Lake Powell** stays below 2.9 at least 90% of months*	**10%** of modeled futures meet *the preferred minimum performance.*	**11%** of modeled futures meet *the preferred minimum performance.*	**24%** of modeled futures meet *the preferred minimum performance.*	**21%** of modeled futures meet *the preferred minimum performance.*	**10%** of modeled futures meet *the preferred minimum performance.*		**13%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures for the first decadal period (2027–2039) in which *monthly preservation risk rank at **Lake Mead** stays below 2.3 at least 90% of months*	**1%** of modeled futures meet *the preferred minimum performance.*	**1%** of modeled futures meet *the preferred minimum performance.*	**2%** of modeled futures meet *the preferred minimum performance.*	**2%** of modeled futures meet *the preferred minimum performance.*	**4%** of modeled futures meet *the preferred minimum performance.*		**3%** of modeled futures meet *the preferred minimum performance.*

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Paleontological resource preservation and stability due to altered sediment transport	Percent of modeled futures for the first decadal period (2027-2039) in which *annual sand area >50th and vegetation cover <50th percentile or sandbar volume >1.5 initial condition at least one out of every 3 years*	**38%** of modeled futures meet *the preferred minimum performance.*	**19%** of modeled futures meet *the preferred minimum performance.*	**35%** of modeled futures meet *the preferred minimum performance.*	**30%** of modeled futures meet *the preferred minimum performance.*	**9%** of modeled futures meet *the preferred minimum performance.*		**9%** of modeled futures meet *the preferred minimum performance.*
Paleontological resource preservation and stability due to altered sediment transport *(continued)*	Percent of modeled futures in which *the fraction of sand mass transported by sandbar-forming flow rates (above 37,000 cfs) is at least 0.4 over 34 years (40% of the sand transport)*	**44%** of modeled futures meet *the preferred minimum performance.*	**75%** of modeled futures meet *the preferred minimum performance.*	**83%** of modeled futures meet *the preferred minimum performance.*	**85%** of modeled futures meet *the preferred minimum performance.*	**78%** of modeled futures meet *the preferred minimum performance.*		**76%** of modeled futures meet *the preferred minimum performance.*
Impacts of increased disturbance, unauthorized collection, and recreational impacts on paleontological resources due to dam operations and altered water levels	Percent of modeled futures for the first decadal period (2027-2039) in which *Lake Powell elevation stays above 3,500 feet in 100% of months*	**4%** of modeled futures meet *the preferred minimum performance*	**19%** of modeled futures meet *the preferred minimum*	**81%** of modeled futures meet *the preferred minimum performance*	**94%** of modeled futures meet *the preferred minimum performance*	**35%** of modeled futures meet *the preferred minimum performance*		**49%** of modeled futures meet *the preferred minimum performance* during the 2027-2039 modeling period.
	Percent of modeled futures for the first decadal period (2027-2039) in which *Lake Mead elevation stays above 975 feet in 100% of months*	**32%** of modeled futures meet *the preferred minimum performance*	**62%** of modeled futures meet *the preferred minimum performance*	**74%** of modeled futures meet *the preferred minimum performance*	**77%** of modeled futures meet *the preferred minimum performance*	**69%** of modeled futures meet *the preferred minimum performance*	**81%** of modeled futures meet *the preferred minimum performance*	**66%** of modeled futures meet *the preferred minimum performance*

Tribal Resources (See Section 3.13)

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Reservoir Elevations that may expose traditional cultural properties, archaeological sites, or sacred sites to increased access and visitation	Lake Powell EOWY elevations	Lowest elevations in the critcally dry flow category exposing the greatest number of sites to visitation	Second lowest elevations in the critcally dry flow category	Highest elevations in the critcally dry flow category exposing the fewest number of sites to visitation	Second highest elevations in the critcally dry flow category	Tied in the middle performing for elevations in the critcally dry flow category	Tied in the middle performing for elevations in the critcally dry flow category	Third highest median elevations in the critcally dry flow category.
	Lake Mead EOCY elevations in feet	Lowest elevations in all flow categories exposing the greatest number of sites to visitation	Second lowest elevations in all flow categories	Third lowest elevations in all flow categories	Third highest elevations in all flow categories	Second highest elevations in all flow categories	Highest elevations in all flow categories exposing the fewest number of sites to visitation	Third lowest median elevations in the critcally dry flow category.

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Projected changes in river flows that may contribute to erosion and exposure of archaeological sites or sacred sites	Projected releases from dams and forecasted river flow volumes that are outside past releases or flows	Under average hydrologic conditions, releases fall within past volumes for the Glen Canyon Dam to Lake Mead reach and Hoover Dam to Lake Mohave. During critically dry conditions, release volumes may drop below past releases; however, impacts would only be for sites close to riverbank. No impacts below Lake Mohave.	Under average hydrologic conditions, releases fall within past volumes for the Glen Canyon Dam to Lake Mead reach and Hoover Dam to Lake Mohave. During critically dry conditions, release volumes may drop below past releases; however, impacts would only be for sites close to riverbank. No impacts below Lake Mohave.	Under average hydrologic conditions, releases fall within past volumes for the Glen Canyon Dam to Lake Mead reach and Hoover Dam to Lake Mohave. During critically dry conditions, release volumes may drop below past releases; however, impacts would only be for sites close to riverbank. No impacts below Lake Mohave.	Under average hydrologic conditions, releases fall within past volumes for the Glen Canyon Dam to Lake Mead reach and Hoover Dam to Lake Mohave. During critically dry conditions, release volumes may drop below past releases; however, impacts would only be for sites close to riverbank. No impacts below Lake Mohave.	Under average hydrologic conditions, releases fall within past volumes for the Glen Canyon Dam to Lake Mead reach and Hoover Dam to Lake Mohave. During critically dry conditions, release volumes may drop below past releases; however, impacts would only be for sites close to riverbank. No impacts below Lake Mohave.		Under average hydrologic conditions, releases fall within past volumes for the Glen Canyon Dam to Lake Mead reach and Hoover Dam to Lake Mohave. During critically dry conditions, release volumes may drop below past releases; however, impacts would only be for sites close to riverbank. No impacts below Lake Mohave.
Projected changes in natural resources important to Native Americans including riparian vegetation and wildlife	Woody riparian habitat most similar to historic conditions	The No Action Alternative is among the middle performing alternative for the Lake Powell, Lake Mead, and Hoover Dam to SIB reaches because the annual variability is neither the most similar nor the least similar to historic conditions for these reaches.	The Basic Coordination Alternative is among the middle performing alternative for the Lake Powell because the annual variability is neither the most similar nor the least similar to historic conditions for this reach. The Basic Coordination Alternative is among the best performing alternatives for the Lake Mead and Hoover Dam to SIB reaches because it has annual variability similar to historic conditions.	Among the best performing alternatives for the Lake Powell reach and among the least performing alternatives for Lake Mead and the Hoover Dam to SIB reach.	Among the middle performing alternatives for the Lake Powell reach and among the best performing alternatives for the Lake Mead reach. Among the least performing alternatives for the Hoover Dam to SIB reach.	Never the best performing alternative but among the middle performing alternatives for the Lake Mead reach because the annual variability is neither the most similar nor the least similar to historic conditions for these reaches. Alternative is among the middle performing alternative for the Lake Mead and Hoover Dam to SIB reaches. Among the least performing alternatives for the Lake Powell reach.		The Representative Preferred Alternative is among the middle performing alternatives for all reaches because the annual variability is neither the most similar nor the least similar to historic conditions for these reaches. Considering all modeled natural flow conditions, no Alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach.
	Critical fish habitat (Colorado River)	Modeling presented for aquatic species suggests that 52% of futures would meet acceptable critical habitat performance standards	Modeling suggests 49% of futures would meet acceptable critical habitat performance standards	Modeling suggests that 28% of futures would meet acceptable critical habitat performance standards	Modeling suggests that 27% of futures would meet acceptable critical habitat performance standards	Modeling suggests that 53% of futures would meet acceptable critical habitat performance standards		Modeling suggests that 40% of futures would meet acceptable critical habitat performance standards

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Recreation (See Section 3.14)

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Reservoir elevation impacts on shoreline recreational facilities, reservoir boating, and sport fishing opportunities	Percent of modeled futures for the first decadal period (2027-2039) in which *the proportion of **Lake Powell** recreation sites open stays above 0.6 (historical benchmark) for all summer months (May 31 – August 31) each year*	**0%** of modeled futures meet *the preferred minimum performance.*	**0%** of modeled futures meet *the preferred minimum performance.*	**0%** of modeled futures meet *the preferred minimum performance.*	**0%** of modeled futures meet *the preferred minimum performance.*	**0%** of modeled futures meet *the preferred minimum performance.*	**0%** of modeled futures meet *the preferred minimum performance.*	**0%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures for the first decadal period (2027-2039) in which *the proportion of **Lake Mead** recreation sites open stays above 0.8 (historical benchmark) for all summer months (May 31 – August 31) each year*	**3%** of modeled futures meet *the preferred minimum performance.*	**6%** of modeled futures meet *the preferred minimum performance.*	**5%** of modeled futures meet *the preferred minimum performance.*	**8%** of modeled futures meet *the preferred minimum performance.*	**13%** of modeled futures meet *the preferred minimum performance.*	**16%** of modeled futures meet *the preferred minimum performance.*	**7%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures for the first decadal period (2027-2039) in which ***Lake Powell** elevation is above the identified boating hazard minimum (3,620 feet) for at least 20% of months*	**47%** of modeled futures meet *the preferred minimum performance.*	**50%** of modeled futures meet *the preferred minimum performance.*	**64%** of modeled futures meet *the preferred minimum performance.*	**69%** of modeled futures meet *the preferred minimum performance.*	**43%** of modeled futures meet *the preferred minimum performance.*	**43%** of modeled futures meet *the preferred minimum performance.*	**55%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures for the first decadal period (2027-2039) in which ***Lake Powell** elevation is above the critical threshold for most boat launch facilities (3,590 feet) for at least 60% of months*	**32%** of modeled futures in first 10 years meet *the preferred minimum performance.*	**34%** of modeled futures in first 10 years meet *the preferred minimum performance.*	**56%** of modeled futures in first 10 years meet *the preferred minimum performance.*	**55%** of modeled futures in first 10 years meet *the preferred minimum performance.*	**31%** of modeled futures in first 10 years meet *the preferred minimum performance.*	**31%** of modeled futures in first 10 years meet *the preferred minimum performance.*	**38%** of modeled futures in first 10 years meet *the preferred minimum performance.*
	Percent of modeled futures for the first decadal period (2027-2039) in which ***Lake Mead** elevation is above the identified boating hazard minimum (1,170 feet) for at least 10% of months*	**12%** of modeled futures meet *the preferred minimum performance.*	**19%** of modeled futures meet *the preferred minimum performance.*	**32%** of modeled futures meet *the preferred minimum performance.*	**36%** of modeled futures meet *the preferred minimum performance.*	**44%** of modeled futures meet *the preferred minimum performance.*	**49%** of modeled futures meet *the preferred minimum performance.*	**31%** of modeled futures in first 10 years meet *the preferred minimum performance.*
	Percent of modeled futures for the first decadal period (2027-2039) in which ***Lake Mead** elevation is 1,040 feet or greater for at least 90% of months*	**5%** of modeled futures meet *the preferred minimum performance.*	**12%** of modeled futures meet *the preferred minimum performance.*	**16%** of modeled futures meet *the preferred minimum performance.*	**18%** of modeled futures meet *the preferred minimum performance.*	**22%** of modeled futures meet *the preferred minimum performance.*	**28%** of modeled futures meet *the preferred minimum performance.*	**18%** of modeled futures meet *the preferred minimum performance.*
Glen Canyon Dam releases impacts on whitewater boating and sport fishing	Percent of modeled futures for the first decadal period (2027-2039) in which *daytime flows (7am – 7pm) below Glen Canyon Dam are at least 5,000 cfs every day*	**92%** of modeled futures meet *the preferred minimum performance.*	**94%** of modeled futures meet *the preferred minimum performance.*	**99%** of modeled futures meet *the preferred minimum performance.*	**40%** of modeled futures meet *the preferred minimum performance.*	**100%** of modeled futures meet *the preferred minimum performance.*	**100%** of modeled futures meet *the preferred minimum performance.*	**98%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures for the first decadal period (2027-2039) in which *daytime flows (7am – 7pm) below Glen Canyon Dam are at least 8,000 cfs at least 95% of days*	**75%** of modeled futures meet *the preferred minimum performance.*	**90%** of modeled futures meet *the preferred minimum performance.*	**1%** of modeled futures meet *the preferred minimum performance.*	**22%** of modeled futures meet *the preferred minimum performance.*	**90%** of modeled futures meet *the preferred minimum performance.*	**90%** of modeled futures meet *the preferred minimum performance.*	**60%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which *water temperature at Lees Ferry (river mile [RM] 0) never exceeds 20°C.*	**19%** of modeled futures meet *the preferred minimum performance.*	**32%** of modeled futures meet *the preferred minimum performance.*	**62%** of modeled futures meet *the preferred minimum performance.*	**60%** of modeled futures meet *the preferred minimum performance.*	**30%** of modeled futures meet *the preferred minimum performance.*	**30%** of modeled futures meet *the preferred minimum performance.*	**36%** of modeled futures meet *the preferred minimum performance.*

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

Dams and Electrical Power Resources (See Section 3.15)

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Reservoir Elevations and Power Pool Robustness	Percent of modeled futures in which *Lake Powell elevation is always above minimum power pool (3,490 feet).*	**25%** of modeled futures meet *the preferred minimum performance.*	**45%** of modeled futures meet *the preferred minimum performance.*	**87%** of modeled futures meet *the preferred minimum performance.*	**98%** of modeled futures meet *the preferred minimum performance.*	**46%** of modeled futures meet *the preferred minimum performance.*	**46%** of modeled futures meet *the preferred minimum performance.*	**66%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which *Lake Mead elevation is always above minimum power pool (950 feet).*	**43%** of modeled futures meet *the preferred minimum performance.*	**68%** of modeled futures meet *the preferred minimum performance.*	**86%** of modeled futures meet *the preferred minimum performance.*	**90%** of modeled futures meet *the preferred minimum performance.*	**77%** of modeled futures meet *the preferred minimum performance.*	**88%** of modeled futures meet *the preferred minimum performance.*	**84**% of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which *Lake Mead elevation is always above the high-head turbines (1,035 feet)*	**7%** of modeled futures meet *the preferred minimum performance.*	**18%** of modeled futures meet *the preferred minimum performance.*	**23%** of modeled futures meet *the preferred minimum performance.*	**22%** of modeled futures meet *the preferred minimum performance.*	**26%** of modeled futures meet *the preferred minimum performance.*	**36%** of modeled futures meet *the preferred minimum performance.*	**25**% of modeled futures meet *the preferred minimum performance.*
Energy Capacity of the Glen Canyon Dam and Hoover Dam Powerplants	August power capacity (megawatt [MW]) under average hydrology conditions	Glen Canyon Dam: 500-635 MW Hoover Dam: 125-1,240 MW	Glen Canyon Dam: 580-750 MW Hoover Dam: 400-1,550 MW	Glen Canyon Dam: 590-790 MW Hoover Dam: 1,300-1,600 MW	Glen Canyon Dam: 600-650 MW Hoover Dam: 1,200-1,700 MW	Glen Canyon Dam: 620 -740 MW Hoover Dam: 1,380-1,700 MW	Glen Canyon Dam: 620 - 740 MW Hoover Dam: 1,490 -1,725 MW	Glen Canyon Dam: 600 - 740 MW Hoover Dam: 1,190 -1.650 MW
	August power capacity (MW) under critically dry hydrology conditions	Glen Canyon Dam: 0-520 MW Hoover Dam: 0-250 MW	Glen Canyon Dam: 0-525 MW Hoover Dam: 0-1,260 MW	Glen Canyon Dam: 250-625 MW Hoover Dam: 200 -1,270 MW	Glen Canyon Dam: 225-380 MW Hoover Dam: 249 – 1,425 MW	Glen Canyon Dam: 0-390 MW Hoover Dam: 0-1,500 MW	Glen Canyon Dam: 0-390 MW Hoover Dam: 240-1,550 MW	Glen Canyon Dam: 225 - 510 MW Hoover Dam: 100 -450 MW
	Water year generation (Megawatt Hours [MWhs under average hydrology conditions	Glen Canyon Dam: 3-4 MWhs Hoover Dam: 1.3-3.3 MWhs	Glen Canyon Dam: 3.1-3.7 MWhs Hoover Dam: 2.8-3.6 MWhs	Glen Canyon Dam: 3-4.1 MWhs Hoover Dam: 2.7-3.8 MWhs	Glen Canyon Dam: 3.3-4 MWhs Hoover Dam: 2.9-3.8 MWhs	Glen Canyon Dam: 3.1-3.6 MWhs Hoover Dam: 2.9-3.9 MWhs	Glen Canyon Dam: 3.1-3.6 MWhs Hoover Dam: 2.9-4 MWhs	Glen Canyon Dam: 3.3-3.6 MWhs Hoover Dam: 2.7—3.8 MWhs
	Water year generation (MWhs) under critically dry hydrology conditions	Glen Canyon Dam: 0-2 MWhs Hoover Dam: 0-2.2 MWhs	Glen Canyon Dam: 0-2.3 MWhs Hoover Dam: 0-3 MWhs	Glen Canyon Dam: 1.8-2.7 MWhs Hoover Dam: 1.7-2.7 MWhs	Glen Canyon Dam: 1.9-2.4 MWhs Hoover Dam: 1.9-3 MWhs	Glen Canyon Dam: 0-2 MWhs Hoover Dam: 0.4-3.2 MWhs	Glen Canyon Dam: 0-2 MWhs Hoover Dam: 2-3.1 MWh s	Glen Canyon Dam: 0.7-2.1 MWhs Hoover Dam: 1.0-3.4 MWhs

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Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Glen Canyon Dam and Hoover Dam spillway infrastructure	Percent of modeled futures in which *the January 1 Lake Powell elevation does not exceed 3,684 feet, the target elevation to preserve flood control storage, in at least 90% of years*.	**80%** of modeled futures meet *the preferred minimum performance*.	**84%** of modeled futures meet *the preferred minimum performance*.	**75%** of modeled futures meet *the preferred minimum performance*.	**72%** of modeled futures meet *the preferred minimum performance*.	**87%** of modeled futures meet *the preferred minimum performance*.	**87%** of modeled futures meet *the preferred minimum performance*.	**89%** of modeled futures meet *the preferred minimum performance*.
	Percent of modeled futures in which *Lake Powell elevation is below 3,700 feet in 100% of months*. The higher the percentage, the more likely Lake Powell will remain below the spillway crest.	**75%** of modeled futures meet *the preferred minimum performance*.	**76%** of modeled futures meet *the preferred minimum performance*.	**69%** of modeled futures meet *the preferred minimum performance*.	**66%** of modeled futures meet *the preferred minimum performance*.	**82%** of modeled futures meet *the preferred minimum performance*.	**82%** of modeled futures meet *the preferred minimum performance*.	**78%** of modeled futures meet *the preferred minimum performance*.
	Percent of modeled futures in which *the Glen Canyon Dam spillway is not utilized*.	**87%** of modeled futures meet *the preferred minimum performance*.	**87%** of modeled futures meet *the preferred minimum performance*.	**84%** of modeled futures meet *the preferred minimum performance*.	**81%** of modeled futures meet *the preferred minimum performance*.	**89%** of modeled futures meet *the preferred minimum performance*.	**89%** of modeled futures meet *the preferred minimum performance*.	**89%** of modeled futures meet *the preferred minimum performance*.
	Percent of modeled futures in which *Lake Mead stays below 1,205.4 feet, the elevation of the Hoover Dam spillway crest, in at least 90% of months*	**93%** of modeled futures meet *the preferred minimum performance*.	**90%** of modeled futures meet *the preferred minimum performance*.	**80%** of modeled futures meet *the preferred minimum performance*.	**78%** of modeled futures meet *the preferred minimum performance*.	**72%** of modeled futures meet *the preferred minimum performance*.	**68%** of modeled futures meet *the preferred minimum performance*.	**81%** of modeled futures meet *the preferred minimum performance*.
	Percent of modeled futures in which *Lake Mead elevation stays below 1,219 feet in at least 90% of months*. The higher the percentage, the more likely Lake Mead will have reserve flood control storage.	**99%** of modeled futures meet *the preferred minimum performance*.	**98%** of modeled futures meet *the preferred minimum performance*.	**95%** of modeled futures meet *the preferred minimum performance*.	**93%** of modeled futures meet *the preferred minimum performance*.	**86%** of modeled futures meet *the preferred minimum performance*.	**84%** of modeled futures meet *the preferred minimum performance*.	**89%** of modeled futures meet *the preferred minimum performance*.
	Percent of modeled futures in which *Lake Mead elevation never exceeds 1,226.9 feet*. At this elevation the volume of spillway discharge triggers a "Imminent Life-Threatening Emergency" response.	**98%** of modeled futures meet *the preferred minimum performance*.	**97%** of modeled futures meet *the preferred minimum performance*.	**94%** of modeled futures meet *the preferred minimum performance*.	**94%** of modeled futures meet *the preferred minimum performance*.	**89%** of modeled futures meet *the preferred minimum performance*.	**88%** of modeled futures meet *the preferred minimum performance*.	**93%** of modeled futures meet *the preferred minimum performance*.
Glen Canyon Dam electricity rates	Glen Canyon Dam number of rate changes	Results indicate one or fewer major rate increases during the 2027–2039 modeling period. For maintaining zero rate increases, 33% of futures meet the minimum performance level.	Results indicate one or fewer major rate increases during the 2027–2039 modeling period. For maintaining zero rate increases, 36% of futures meet the minimum performance level.	Results indicate one or fewer major rate increases during the 2027–2039 modeling period. For maintaining zero rate increases, 44% of futures meet the minimum performance level.	Results indicate one or fewer major rate increases during the 2027–2039 modeling period. For maintaining zero rate increases, 44% of futures meet the minimum performance level.	Results indicate one or fewer major rate increases during the 2027–2039 modeling period. For maintaining zero rate increases, 32% of futures meet the minimum performance level.	Results indicate one or fewer major rate increases during the 2027–2039 modeling period. For maintaining zero rate increases, 32% of futures meet the minimum performance level.	Results indicate one or fewer major rate increases during the 2027–2039 modeling period. For maintaining zero rate increases, 37% of futures meet the minimum performance level.

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Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	**Basic Coordination Alternative**	**Enhanced Coordination Alternative**	**Maximum Operational Flexibility Alternative**	**Supply Driven Alternative (LB Priority)**	**Supply Driven Alternative (LB Pro Rata)**	**Representative Preferred Alternative**
Annual Market Value of the Glen Canyon Dam and Hoover Dam Powerplants	Annual Market Value (million dollars) of Glen Canyon Dam Generation under average hydrology conditions	Glen Canyon Dam: $160 million - $230 million Hoover Dam: $50 million - $125 million	Glen Canyon Dam: $190 million - $210 million Hoover Dam: $100 million - $190 million	Glen Canyon Dam: $190 million - $250 million Hoover Dam: $145 million - $190 million	Glen Canyon Dam: $200 million - $250 million Hoover Dam: $140 million - $200 million	Glen Canyon Dam: $190 million - $210 million Hoover Dam: $150 million - $210 million	Glen Canyon Dam: $190 million - $210 million Hoover Dam: $150 million - $215M	Glen Canyon Dam: $200 million - $210 million Hoover Dam: $140 million - $200 million
	Annual Market Value (million dollars) of Hoover Dam Generation under critically dry hydrology conditions	Glen Canyon Dam: $0 - $100 million Hoover Dam: $0 - $100 million	Glen Canyon Dam: $0 - $100 million Hoover Dam: $0 - $110 million	Glen Canyon Dam: $100 million - $160million Hoover Dam: $75 million - $125 million	Glen Canyon Dam: $100 million - $150 million Hoover Dam: $80 million - $145 million	Glen Canyon Dam: $0 million - $100 million Hoover Dam: $0 - $155 million	Glen Canyon Dam: $0 million - $100 million Hoover Dam: $90 million - $160 million	Glen Canyon Dam: $40 million - $130 million Hoover Dam: $40 million - $160 million

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Socioeconomics (See Section 3.16)

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Economic contributions and social conditions associated with changes in agriculture due to water shortages	Level of annual impacts on acres of fallowed agricultural lands during a maximum shortage	For Arizona non-tribal agriculture entitlement holders, the No Action Alternative has the **lowest level of impact** on acres of fallowed lands during a maximum shortage of 0.6 maf, with an increase of about 1,000 fallowed acres.[4] For California non-tribal, California tribal, and Nevada tribal agriculture entitlement holders, the No Action Alternative is among the alternatives with the **lowest level of impact** on acres of fallowed lands during a maximum shortage of 0.6 maf, with no change in fallowed acres. For Arizona tribal agriculture entitlement holders, the No Action Alternative has the **lowest level of impact** on acres of fallowed lands during a maximum shortage of 0.6 maf, with an increase of about 12,000 fallowed acres.	For Arizona non-tribal agriculture entitlement holders, the Basic Coordination Alternative is among the alternatives with a **low level of impact** on acres of fallowed lands during a maximum shortage of 1.5 maf, with an increase of about 7,000 fallowed acres.[4] For California non-tribal, California tribal, and Nevada tribal agriculture entitlement holders, the Basic Coordination Alternative is among the alternatives with the **lowest level of impact** on acres of fallowed lands during a maximum shortage of 1.5 maf, with no change in fallowed acres. For Arizona tribal agriculture entitlement holders, the Basic Coordination Alternative is among the alternatives with a **medium level of impact** on acres of fallowed lands during a maximum shortage of 1.5 maf, with an increase of about 50,000 fallowed acres.	For Arizona non-tribal agriculture entitlement holders, the Enhanced Coordination Alternative is among the alternatives with a **medium level of impact** on acres of fallowed lands during a maximum shortage of 3.0 maf, with an increase of about 62,000 fallowed acres. For California non-tribal, California tribal, and Nevada tribal agriculture entitlement holders, the Enhanced Coordination Alternative has the **highest level of impact** on acres of fallowed lands during a maximum shortage of 3.0 maf, with an increase of about 283,000, 5,000, and 700 fallowed acres for California non-tribal, California tribal, and Nevada tribal agriculture entitlement holders, respectively. For Arizona tribal agriculture entitlement holders, the Enhanced Coordination Alternative is among the alternatives with a **medium level of impact** on acres of fallowed lands during a maximum shortage of 3.0 maf, with an increase of about 39,000 fallowed acres.	For Arizona non-tribal agriculture entitlement holders, the Maximum Operational Flexibility Alternative has the **highest level of impact** on acres of fallowed lands during a maximum shortage of 4.0 maf, with an increase of about 103,000 fallowed acres. For California non-tribal agriculture entitlement holders, the Maximum Operational Flexibility Alternative is among the alternatives with a **high level of impact** on acres of fallowed lands during a maximum shortage of 4.0 maf, with an increase of about 227,000 fallowed acres. For California tribal and Nevada tribal agriculture entitlement holders, the Maximum Operational Flexibility Alternative is among the alternatives with the **lowest level of impact** on acres of fallowed lands during a maximum shortage of 4.0 maf, with no change in fallowed acres. For Arizona tribal agriculture entitlement holders, the Maximum Operational Flexibility Alternative has the **highest level of impact** on acres of fallowed lands during a maximum shortage of 4.0 maf, with an increase of about 68,000 fallowed acres.	For Arizona non-tribal agriculture entitlement holders, the Supply Driven Alternative (LB Priority approach) is among the alternatives with a **low level of impact** on acres of fallowed lands during a maximum shortage of 2.1 maf, with an increase of about 8,000 fallowed acres. For California non-tribal agriculture entitlement holders, the Supply Driven Alternative (LB Priority approach) is among the alternatives with a **low level of impact** on acres of fallowed lands during a maximum shortage of 2.1 maf, with an increase of about 12,000 fallowed acres. For California tribal and Nevada tribal agriculture entitlement holders, the Supply Driven Alternative (LB Priority approach) is among the alternatives with the **lowest level of impact** on acres of fallowed lands during a maximum shortage of 2.1 maf, with no change in fallowed acres. For Arizona tribal agriculture entitlement holders, the Supply Driven Alternative (LB Priority approach) is among the alternatives with a **high level of impact** on acres of fallowed lands during a maximum shortage of 2.1 maf, with an increase of about 54,000 fallowed acres.	For Arizona non-tribal agriculture entitlement holders, the Supply Driven Alternative (LB Pro Rata approach) is among the alternatives with a **medium level of impact** on acres of fallowed lands during a maximum shortage of 2.1 maf, with an increase of about 61,000 fallowed acres. For California non-tribal, California tribal, and Nevada tribal agriculture entitlement holders, the Supply Driven Alternative (LB Pro Rata approach) is among the alternatives with a **high level of impact** on acres of fallowed lands during a maximum shortage of 2.1 maf, with an increase of about 153,000, 3,000, and 500 fallowed acres for California non-tribal, California tribal, and Nevada tribal agriculture entitlement holders, respectively. For Arizona tribal agriculture entitlement holders, the Supply Driven Alternative (LB Pro Rata approach) is among the alternatives with a **medium level of impact** on acres of fallowed lands during a maximum shortage of 2.1 maf, with an increase of about 39,000 fallowed acres.	For Arizona non-tribal agriculture entitlement holders, the Representative Preferred Alternative is among the alternatives with a **high level of impact** on acres of fallowed lands during a maximum shortage of 3.6 maf, with an increase of about 91,000 fallowed acres. For California non-tribal agriculture entitlement holders, the Representative Preferred Alternative is among the alternatives with a **high level of impact** on acres of fallowed lands during a maximum shortage of 3.6 maf, with an increase of about 151,000 fallowed acres. For California tribal and Nevada tribal agriculture entitlement holders, the Representative Preferred Alternative is among the alternatives with the **lowest level of impact** on acres of fallowed lands during a maximum shortage of 3.6 maf, with no change in fallowed acres. For Arizona tribal agriculture entitlement holders, the Representative Preferred Alternative is among the alternatives with a **high level of impact** on acres of fallowed lands during a maximum shortage of 3.6 maf, with an increase of about 67,000 fallowed acres.

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[4] Note that these impacts are based on low maximum Lower Basin shortage volumes that translate to higher volumes of dead pool-related reductions (see **Figure TA 4-12**), which could result in significant but highly uncertain impacts.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Economic contributions and social conditions associated with changes in agriculture due to water shortages *(continued)*	Level of annual impacts on market value of crop production from a maximum shortage	For Arizona non-tribal agriculture entitlement holders, the No Action Alternative has the **lowest level of impact** on market value of crops during a maximum shortage of 0.6 maf, with a loss in market value of about $1.8 million.[4] For California non-tribal, California tribal, and Nevada tribal agriculture entitlement holders, the No Action Alternative is among the alternatives with the **lowest level of impact** on market value of crops during a maximum shortage of 0.6 maf, with no loss in market value. For Arizona tribal agriculture entitlement holders, the No Action Alternative has the **lowest level of impact** on market value of crops during a maximum shortage of 0.6 maf, with a loss in market value of about $17.4 million.	For Arizona non-tribal agriculture entitlement holders, the Basic Coordination Alternative is among the alternatives with a **low level of impact** on market value of crops during a maximum shortage of 1.5 maf, with a loss in market value of about $17.6 million.[4] For California non-tribal, California tribal, and Nevada tribal agriculture entitlement holders, the Basic Coordination Alternative is among the alternatives with the **lowest level of impact** on market value of crops during a maximum shortage of 1.5 maf, with no change in market value. For Arizona tribal agriculture entitlement holders, the Basic Coordination Alternative is among the alternatives with a **high level of impact** on market value of crops during a maximum shortage of 1.5 maf, with a loss in market value of about $82.3 million.	For Arizona non-tribal agriculture entitlement holders, the Enhanced Coordination Alternative is among the alternatives with a **medium level of impact** on market value of crops during a maximum shortage of 3.0 maf, with a loss in market value of about $79.6 million. For California non-tribal, agriculture entitlement holders, the Enhanced Coordination Alternative is among the alternatives with a **high level of impact** on market value of crops during a maximum shortage of 3.0 maf, with a loss in market value of about $691.8 million. For California tribal and Nevada tribal agriculture entitlement holders, the Enhanced Coordination Alternative has the **highest level of impact** on market value of crops during a maximum shortage of 3.0 maf, with a loss in market value of about $10.9 million and $0.6 million, for California tribal and Nevada tribal agriculture entitlement holders, respectively. For Arizona tribal agriculture entitlement holders, the Enhanced Coordination Alternative is among the alternatives with a **medium level of impact** on market value of crops during a maximum shortage of 3.0 maf, with a loss in market value of about $52.5 million.	For Arizona non-tribal agriculture entitlement holders, the Maximum Operational Flexibility Alternative has the **highest level of impact** on market value of crops during a maximum shortage of 4.0 maf, with a loss in market value of about $150.8 million. For California non-tribal agriculture entitlement holders, the Maximum Operational Flexibility Alternative has the **highest level of impact** on market value of crops during a maximum shortage of 4.0 maf, with a loss in market value of about $1,094.3 million. For California tribal and Nevada tribal agriculture entitlement holders, the Maximum Operational Flexibility Alternative is among the alternatives with the **lowest level of impact** on market value of crops during a maximum shortage of 4.0 maf, with no change in market value. For Arizona tribal agriculture entitlement holders, the Maximum Operational Flexibility Alternative has the **highest level of** on market value of crops during a maximum shortage of 4.0 maf, with a loss in market value of about $113.2 million.	For Arizona non-tribal agriculture entitlement holders, the Supply Driven Alternative (LB Priority approach) is among the alternatives with a **low level of impact** on market value of crops during a maximum shortage of 2.1 maf, with a loss in market value of about $21.0 million. For California non-tribal agriculture entitlement holders, the Supply Driven Alternative (LB Priority approach) is among the alternatives with a **low level of impact** on market value of crops during a maximum shortage of 2.1 maf, with a loss in market value of about $25.4 million. For California tribal and Nevada tribal agriculture entitlement holders, the Supply Driven Alternative (LB Priority approach) is among the alternatives with the **lowest level of impact** on market value of crops during a maximum shortage of 2.1 maf, with no change in market value. For Arizona tribal agriculture entitlement holders, the Supply Driven Alternative (LB Priority approach) is among the alternatives with a **high level of impact** on market value of crops during a maximum shortage of 2.1 maf with a loss in market value of about $88.7 million.	For Arizona non-tribal agriculture entitlement holders, the Supply Driven Alternative (LB Pro Rata approach) is among the alternatives with a **medium level of impact** on market value of crops during a maximum shortage of 2.1 maf, with a loss in market value of about $78.2 million. For California non-tribal, California tribal, and Nevada tribal agriculture entitlement holders, the Supply Driven Alternative (LB Pro Rata approach) is among the alternatives with a **high level of impact** on market value of crops during a maximum shortage of 2.1 maf, with a loss in market value of about $473.8 million, $7.7 million, and $0.5 million, for California non-tribal, California tribal, and Nevada tribal agriculture entitlement holders, respectively. For Arizona tribal agriculture entitlement holders, the Supply Driven Alternative (LB Pro Rata approach) is among the alternatives with a **medium level of impact** on market value of crops during a maximum shortage of 2.1 maf with a loss in market value of about $51.7 million.	For Arizona non-tribal agriculture entitlement holders, the Representative Preferred Alternative is among the alternatives with a **high level of impact** on market value of crops during a maximum shortage of 3.6 maf, with a loss in market value of about $133.1 million. For California non-tribal agriculture entitlement holders, the Representative Preferred Alternative is among the alternatives with a **high level of impact** on market value of crops during a maximum shortage of 3.6 maf, with a loss in market value of about $812.7 million. For California tribal and Nevada tribal agriculture entitlement holders, the Representative Preferred Alternative is among the alternatives with the **lowest level of impact** on market value of crops during a maximum shortage of 3.6 maf, with no change in market value. For Arizona tribal agriculture entitlement holders, the Representative Preferred Alternative is among the alternatives with a **high level of impact** on market value of crops during a maximum shortage of 3.6 maf, with a loss in market value of about $111.9 million.

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[4] Note that these impacts are based on low maximum Lower Basin shortage volumes that translate to higher volumes of dead pool-related reductions (see **Figure TA 4-12**), which could result in significant but highly uncertain impacts.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Economic contributions and social conditions associated with changes in agriculture due to water shortages *(continued)*	Level of annual impacts on economic contributions, including jobs, labor income, and total economic output from a maximum shortage	For Arizona non-tribal agriculture entitlement holders, the No Action Alternative has the **lowest level of impact** on economic contributions during a maximum shortage of 0.6 maf, with a loss of over 10 jobs, about $0.6 million in labor income, and $2.8 million in economic output.[4] For California non-tribal, California tribal, and Nevada tribal agriculture entitlement holders, the No Action Alternative is among the alternatives with the **lowest level of impact** on economic contributions during a maximum shortage of 0.6 maf, with no loss in jobs, labor income, or economic output. For Arizona tribal agriculture entitlement holders, the No Action Alternative has the **lowest level of impact** on economic contributions during a maximum shortage of 0.6 maf, with a loss of about 135 jobs, $10.7 million in labor income, and $34.8 million in economic output.	For Arizona non-tribal agriculture entitlement holders, the Basic Coordination Alternative is among the alternatives with a **medium level of impact** on economic contributions during a maximum shortage of 1.5 maf, with a loss of about 135 jobs, $8.1 million in labor income, and $27.4 million in economic output.[4] For California non-tribal, California tribal, and Nevada tribal agriculture entitlement holders, the Basic Coordination Alternative is among the alternatives with the **lowest level of impact** on economic contributions during a maximum shortage of 1.5 maf, with no change in jobs, labor income, or economic output. For Arizona tribal agriculture entitlement holders, the Basic Coordination Alternative is among the alternatives with a **high level of impact** on economic contributions during a maximum shortage of 1.5 maf, with a loss of about 900 jobs, $48.1 million in labor income, and $162.2 million in economic output[4]	For Arizona non-tribal agriculture entitlement holders, the Enhanced Coordination Alternative is among the alternatives with a **high level of impact** on economic contributions during a maximum shortage of 3.0 maf, with a loss of about 500 jobs, $29.0 million in labor income, and $126.8 million in economic output. For California non-tribal agriculture entitlement holders, the Enhanced Coordination Alternative is among the alternatives with a **high level of impact** on economic contributions during a maximum shortage of 3.0 maf, with a loss of about 4,000 jobs, $246.5 million in labor income, and $1.0 billion in economic output. For California tribal and Nevada tribal agriculture entitlement holders, the Enhanced Coordination Alternative has the **highest level of impact** on economic contributions during a maximum shortage of 3.0 maf, with a loss of about 63 jobs, $3.9 million in labor income, and $15.9 million in economic output for California tribal entitlement holders, and a loss of about 13 jobs, $0.1 million in labor income, and $0.9 million in economic output for Nevada tribal agriculture entitlement holders. For Arizona tribal agriculture entitlement holders, the Enhanced Coordination Alternative is among the alternatives with a **high level of impact** on economic contributions during a maximum shortage of 1.5 maf,	For Arizona non-tribal agriculture entitlement holders, the Maximum Operational Flexibility Alternative has the **highest level of impact** on economic contributions during a maximum shortage of 4.0 maf, with a loss of about 1,000 jobs, $56.5 million in labor income, and $237.7 million in economic output. For California non-tribal agriculture entitlement holders, the Maximum Operational Flexibility Alternative has the **highest level of impact** on economic contributions during a maximum shortage of 4.0 maf, with a loss of about 11,000 jobs, $824.7 million in labor income, and $1.8 billion in economic output. For California tribal and Nevada tribal agriculture entitlement holders, the Maximum Operational Flexibility Alternative is among the alternatives with the **lowest level of impact** on economic contributions during a maximum shortage of 4.0 maf, with no change in jobs, labor income, or economic output. For Arizona tribal agriculture entitlement holders, the Maximum Operational Flexibility Alternative has the **highest level of** on economic contributions during a maximum shortage of 1.5 maf, with a loss of about 1,000 jobs, $64.7 million in labor income, and $222.6 million in economic output.	For Arizona non-tribal agriculture entitlement holders, the Supply Driven Alternative (LB Priority approach) is among the alternatives with a **medium level of impact** on economic contributions during a maximum shortage of 2.1 maf, with a loss of about 160 jobs, $9.5 million in labor income, and $32.6 million in economic output. For California non-tribal agriculture entitlement holders, the Supply Driven Alternative (LB Priority approach) is among the alternatives with a low **level of impact** on economic contributions during a maximum shortage of 2.1 maf, with a loss of over 140 jobs, about $8.5 million in labor income, and $36.9 million in economic output. For California tribal and Nevada tribal agriculture entitlement holders, the Supply Driven Alternative (LB Priority approach) is among the alternatives with the **lowest level of impact** on economic contributions during a maximum shortage of 2.1 maf, with no change in jobs, labor income, or economic output. For Arizona tribal agriculture entitlement holders, the Supply Driven Alternative (LB Priority approach) is among the alternatives with a **high level of impact** on economic contributions during a maximum shortage of 1.5 maf, with a loss of about 900 jobs, $51.3 million in labor income, and $174.6 million in economic output.	For Arizona non-tribal agriculture entitlement holders, the Supply Driven Alternative (LB Pro Rata approach) is among the alternatives with a **high level of impact** on economic contributions during a maximum shortage of 2.1 maf, with a loss of 500 jobs, about $28.4 million in labor income, and $124.3 million in economic output. For California non-tribal agriculture entitlement holders, the Supply Driven Alternative (LB Pro Rata approach) is among the alternatives with a **high level of impact** on economic contributions during a maximum shortage of 2.1 maf, with a loss of about 3,000 jobs, $173.4 million in labor income, and $689.2 million in economic output. For California tribal and Nevada tribal agriculture entitlement holders, the Supply Driven Alternative (LB Pro Rata approach) is among the alternatives with a **low level of impact** on economic contributions during a maximum shortage of 2.1 maf, with a loss of about 45 jobs, $2.8 million in labor income, and $11.2 million in economic output for California tribal entitlement holders, and a loss of about 9 jobs, $0.1 million in labor income, and $0.6 million in economic output for Nevada tribal agriculture entitlement holders. For Arizona tribal agriculture entitlement holders, the Supply Driven Alternative (LB Pro Rata approach) is among the alternatives with a **high level of impact** on economic contributions during a	For Arizona non-tribal agriculture entitlement holders, the Representative Preferred Alternative is among the alternatives with a **high level of impact** on economic contributions during a maximum shortage of 3.6 maf, with a loss of 900 jobs, about $50.5 million in labor income, and $210.7 million in economic output. For California non-tribal agriculture entitlement holders, the Representative Preferred Alternative is among the alternatives with a **high level of impact** on economic contributions during a maximum shortage of 3.6 maf, with a loss of 9,000 jobs, about $718.1 million in labor income, and $1.3 billion in economic output. For California tribal and Nevada tribal agriculture entitlement holders, the Representative Preferred Alternative is among the alternatives with the **lowest level of impact** on economic contributions during a maximum shortage of 3.6 maf, with no change in jobs, labor income, or economic output. For Arizona tribal agriculture entitlement holders, the Representative Preferred Alternative is among the alternatives with a **high level of impact** on economic contributions during a maximum shortage of 3.6 maf, with a loss of 1,000 jobs, about $64.0 million in labor income, and $220.0 million in economic output.

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[4] Note that these impacts are based on low maximum Lower Basin shortage volumes that translate to higher volumes of dead pool-related reductions (see **Figure TA 4-12**), which could result in significant but highly uncertain impacts.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Economic contributions and social conditions associated with changes in agriculture due to water shortages *(continued)*	*(see above)*	*(see above)*	*(see above)*	with a loss of about 500 jobs, $31.2 million in labor income, and $104.7 million in economic output.	*(see above)*	*(see above)*	maximum shortage of 1.5 maf, with a loss of about 400 jobs, $30.7 million in labor income, and $103.0 million in economic output.	*(see above)*
	Impacts on nonmarket values and social conditions from changes in agriculture	For non-tribal and tribal agriculture entitlement holders in Arizona, California, and Nevada, the No Action Alternative is among the alternatives with the **lowest level of impact** on access and quality of nonmarket values and social conditions due to the little to no increases in acreages of fallowed agriculture lands expected from shortages, under this alternative.[4]	For Arizona non-tribal agriculture entitlement holders, the Basic Coordination Alternative is among the alternatives with a **low level of impact** on access and quality of nonmarket values and social conditions due to the low level of impact on acreages of fallowed agriculture lands from shortages.[4] For California non-tribal, California tribal, and Nevada tribal agriculture entitlement holders, the Basic Coordination Alternative is among the alternatives with the **lowest level of impact** on access and quality of nonmarket values and social conditions due to the little to no increases in acreages of fallowed agriculture lands expected from shortages, under this alternative. For Arizona tribal agriculture entitlement holders, the Basic Coordination Alternative is among the alternatives with a **medium level of impact** on access and quality of nonmarket values and social conditions due to the medium level of impact on acreages of fallowed agriculture lands from shortages.	For Arizona non-tribal and tribal agriculture entitlement holders, the Enhanced Coordination Alternative is among the alternatives with a **medium level of impact** on access and quality of nonmarket values and social conditions due to the medium level of impact on acreages of fallowed agriculture lands from shortages. For California non-tribal, California tribal, and Nevada tribal agriculture entitlement holders, the Enhanced Coordination Alternative is among the alternatives with a **high level of impact** on access and quality of nonmarket values and social conditions due to the high level of impact on acreages of fallowed agriculture lands from shortages.	For Arizona non-tribal and tribal agriculture entitlement holders, the Maximum Operational Flexibility Alternative is among the alternatives with a **high level of impact** on access and quality of nonmarket values and social conditions due to the high level of impact on acreages of fallowed agriculture lands from shortages. For California non-tribal agriculture entitlement holders, the Maximum Operational Flexibility Alternative is among the alternatives with a **high level of impact** on access and quality of nonmarket values and social conditions due to the high level of impact on acreages of fallowed agriculture lands from shortages. For California tribal and Nevada tribal agriculture entitlement holders, the Maximum Operational Flexibility Alternative is among the alternatives with the **lowest level of impact** on access and quality of nonmarket values and social conditions due to the little to no increases in acreages of	For Arizona non-tribal agriculture entitlement holders, the Supply Driven Alternative (LB Priority approach) is among the alternatives with a **low level of impact** on access and quality of nonmarket values and social conditions due to the low level of impact on acreages of fallowed agriculture lands from shortages. For California non-tribal agriculture entitlement holders, the Supply Driven Alternative (LB Priority approach) is among the alternatives with a **low level of impact** on access and quality of nonmarket values and social conditions due to the low level of impact on acreages of fallowed agriculture lands from shortages. For California tribal and Nevada tribal agriculture entitlement holders, the Supply Driven Alternative (LB Priority approach) is among the alternatives with the **lowest level of impact** on access and quality of nonmarket values and social conditions due to the little to no increases in acreages of	For Arizona non-tribal and tribal agriculture entitlement holders, the Supply Driven Alternative (LB Pro Rata approach) is among the alternatives with a **medium level of impact** on access and quality of nonmarket values and social conditions due to the medium level of impact on acreages of fallowed agriculture lands from shortages. For California non-tribal, California tribal, and Nevada tribal agriculture entitlement holders, the Supply Driven Alternative (LB Pro Rata approach) is among the alternatives with a **high level of impact** on access and quality of nonmarket values and social conditions due to the high level of impact on acreages of fallowed agriculture lands from shortages.	For Arizona non-tribal and tribal agriculture entitlement holders, the Representative Preferred Alternative is among the alternatives with a **high level of impact** on access and quality of nonmarket values and social conditions due to the high level of impact on acreages of fallowed agriculture lands from shortages. For California non-tribal agriculture entitlement holders, the Representative Preferred Alternative is among the alternatives with a **high level of impact** on access and quality of nonmarket values and social conditions due to the high level of impact on acreages of fallowed agriculture lands from shortages. For California tribal and Nevada tribal agriculture entitlement holders, the Representative Preferred Alternative is among the alternatives with the **lowest level of impact** on access and quality of nonmarket values and social conditions due to the little to no increases in acreages of fallowed agriculture lands expected from shortages, under this alternative.

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

[4] Note that these impacts are based on low maximum Lower Basin shortage volumes that translate to higher volumes of dead pool-related reductions (see **Figure TA 4-12**), which could result in significant but highly uncertain impacts.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Economic contributions and social conditions associated with changes in agriculture due to water shortages *(continued)*	*(see above)*	*(see above)*	*(see above)*	*(see above)*	fallowed agriculture lands expected from shortages, under this alternative.	fallowed agriculture lands expected from shortages, under this alternative. For Arizona tribal agriculture entitlement holders, the Supply Driven Alternative (LB Priority approach) is among the alternatives with a **high level of impact** on access and quality of nonmarket values and social conditions due to the high level of impact on acreages of fallowed agriculture lands from shortages.	*(see above)*	*(see above)*

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.
[4] Note that these impacts are based on low maximum Lower Basin shortage volumes that translate to higher volumes of dead pool-related reductions (see **Figure TA 4-12**), which could result in significant but highly uncertain impacts.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	**Basic Coordination Alternative**	**Enhanced Coordination Alternative**	**Maximum Operational Flexibility Alternative**	**Supply Driven Alternative (LB Priority)**	**Supply Driven Alternative (LB Pro Rata)**	**Representative Preferred**
Economic contributions and value associated with Lake-Based Recreation	Changes in recreation visitor spending and associated regional employment, labor income, and total economic output from lake-based recreation-related activities	Under No Action and all Action Alternatives, declining reservoir elevations at Lake Powell and Lake Mead reduce access to boating, marina operations, and shoreline recreation in dry conditions. This is expected to lead to a decrease in visitation and associated spending on lodging, food services, and transportation-related spending in nearby gateway communities. Businesses that rely on water-based visitation, including marinas, guide services, motels, and equipment rentals, are expected to experience losses in jobs and labor income. Downstream economic effects also weaken, reducing Potential for overall economic output.	Decreases in visitation and associated spending would occur under dry conditions as described under the No Action Alternative. For Lake Powell, economic contributions associated with recreational use are likely to be similar to existing conditions For Lake Mead, there is more robust performance related to recreation site access and navigation thresholds, therefore visitation and spending associated with this reservoir are anticipated to be maintained at levels at or above that of the No Action Alternative.	Decreases in visitation and associated spending would occur under dry conditions as described under the No Action Alternative. This alternative is among the most robust in terms of meeting thresholds for navigation in Lake Powell, and recreation access and Lake Mead. Consequently, Employment and income losses remain but occur at lower levels relative to No Action and Basic Coordination Alternatives. Gateway communities experience more consistent seasonal activity.	Decreases in visitation and associated spending would occur under dry conditions as described under the No Action Alternative. As discussed under for the Maximum Operational Flexibility Alternative, consequently, economic contributions from lake-based recreation would likely be higher than the CCS Comparative Baseline and No Action Alternative due to more robust maintenance of access for recreation sites and navigation Consequently Employment and income losses remain but occur at lower levels relative to No Action and Basic Coordination Alternatives. Gateway communities experience more consistent seasonal activity.	Decreases in visitation and associated spending would occur under dry conditions as described under the No Action Alternative. For Lake Powell recreation site and navigation access would be less robust than the No Action Alternative which could further impact recreational spending and gateway businesses and concessionaire associated with Lake Powell. In contrast, for Lake Mead, the Supply Driven Alternative (LB Priority approach) modeling represents the most robust outcomes for recreation site access and navigation, supporting continued or increased spending associated with recreation activities for this reservoir.	Decreases in visitation and associated spending would occur under dry conditions as described under the No Action Alternative. Impacts would be the same as described for the Supply Driven Alternative (LB Priority approach).	Decreases in visitation and associated spending would occur under dry conditions as described under the No Action Alternative. On Lake Powell, the Representative Preferred would be slightly more robust in terms of maintenance of critical thresholds for navigation than the No Action Alternative and CCS Comparative Baseline. Compared to other action alternatives, this is better than the Supply Driven Alternative (both LB Priority and LB Pro Rata approaches), but less robust than the Enhanced Coordination and Maximum Operational Flexibility Alternatives in terms of support for recreational spending. For reservoir-based recreation on Lake Mead, the Representative Preferred modeling represents less robust outcomes for recreational site access as compared to the CCS Comparative Baseline but slightly more robust outcomes than the No Action Alternative This is a similar level of performance to the other action alternatives. For navigation, the Representative Preferred Alternative is more robust at meeting defined thresholds than both the No Action and CCS Comparative Baseline.

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred
Economic contributions and value associated with Lake-Based Recreation *(continued)*	*(see above)*	*(see above)*	*(see above)*	*(see above)*	*(see above)*	*(see above)*	*(see above)*	Overall, recreational spending and gateway businesses and concessionaire associated with Lake Mead would be similar to other action alternatives.
	Percent of modeled futures in which *the annual recreational value[5] of whitewater boating exceeds 32 million dollars at least 90% of years* over the first decadal period. This threshold indicates when modeled futures achieve recreation values at least as high as the lowest 10% of outcomes for recreation value based on recent historic hydrologic data (2020-2023).	**60%** of modeled futures meet *the preferred minimum performance.*	**78%** of modeled futures meet *the preferred minimum performance.*	**18%** of modeled futures meet *the preferred minimum performance.*	**36%** of modeled futures meet *the preferred minimum performance.*	**38%** of modeled futures meet *the preferred minimum performance.*	**38%** of modeled futures meet *the preferred minimum performance.*	**37%** of modeled futures meet *the preferred minimum performance.*

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

[5] Recreational value of whitewater boating is calculated based on net economic value changes for whitewater rafting in Grand Canyon. This approach follows the methods used in the Glen Canyon Dam Long-Term Experimental and Management Plan Final Supplemental Environmental Impact Statement, where past survey research (Neher et al. 2017, Bishop et al. 1987) informed models to project the change in net economic value under different river flow scenarios. These models link willingness-to-pay estimates for boaters to hydrologic conditions, providing a measure of recreation benefits that extends beyond market spending. Reclamation used similar methods for the analysis of potential impacts on recreation as were used in the 2007 Final EIS and 2024 Near-term Colorado River Operations Final Supplemental Environmental Impact Statement (2024 Final SEIS) to assess the effects on recreation value associated with white-water boating.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Economic contributions and value associated with Lake-Based and River-based Recreation *(continued)*	Percent of modeled futures in which *the annual recreational value[6] of angling exceeds 1.75 million dollars in at least 90% of years* over the first decadal period. This value indicates when modeled futures achieve recreation values at least as high as the lowest 10% of outcomes for recreation value based on recent historic hydrologic data (2020-2023).	**40%** of modeled futures meet *the preferred minimum performance.*	**63%** of modeled futures meet *the preferred minimum performance.*	**2%** of modeled futures meet *the preferred minimum performance.*	**19%** of modeled futures meet *the preferred minimum performance.*	**34%** of modeled futures meet *the preferred minimum performance.*	**34%** of modeled futures meet *the preferred minimum performance.*	**9%** of modeled futures meet *the preferred minimum performance.*

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

[6] Recreational value of angling is calculated based on net economic value changes for angling in Glen Canyon. This approach follows the methods used in the Glen Canyon Dam Long-Term Experimental and Management Plan Final Supplemental Environmental Impact Statement, where past survey research (Neher et al. 2017, Bishop et al. 1987) informed models to project the change in net economic value under different river flow scenarios. These models link willingness-to-pay estimates for boaters to hydrologic conditions, providing a measure of recreation benefits that extends beyond market spending. Reclamation used similar methods for the analysis of potential impacts on recreation as were used in the 2007 Final EIS and 2024 Final SEIS to assess the effects on recreation value associated with angling.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
How would anticipated water shortages and changes in water levels in reservoirs and river segments affect access and quality of nonmarket values?	Changes in existence and symbolic values of the river due to shifts in scenic character or ecological conditions.	Lower reservoir elevations and increased shoreline exposure reduce opportunities for solitude, as well as access to quiet coves, beaches, and natural shorelines. These conditions diminish the experiential qualities that many users value. Extended low-flow periods could also impact river-based experiences in Grand Canyon due to changes in setting which could impact perceived naturalness (see **TA 14, Recreation**). Cultural and spiritual values tied to iconic landscapes and cultural artifacts could also be impacted in low-hydrologic flow periods (see **TA 11, Cultural Resources**). Ecological services such as riparian habitat stability may decline, influencing non-use values related to wildlife and vegetation communities (see **TA 8, Biological Resources – Fish and Other Aquatic Resources**).	Under dry conditions nonmarket values could be impacted as discussed under the no action alternative. More frequent low-elevation conditions could occur in the Basic Coordination Alternative, which could noticeably affect nonmarket values tied to lake-based recreation and scenic quality (see **TA 14, Recreation**) although at a reduced level compared to the No Action Alternative. Reduced reservoir levels may expose previously submerged areas, altering visual character and diminishing opportunities for solitude. Overall impacts are similar to the No Action.	Under dry conditions nonmarket values could be impacted as discussed under the no action alternative. The Enhanced Coordination Alternative is more robust in terms of the support for nonmarket values, particularly for values associated with Lake Powell, as reservoir levels would be maintained at thresholds supporting access for boating and camping in more modeled futures, supporting experiential benefits and cultural connections (see **TA 11, Cultural Resources**). River-based recreation quality is expected to remain high, due to increased stability with flow-dependent activities (see **TA 14, Recreation**). Non-use values tied to ecosystem services, such as wildlife habitat and riparian vegetation, would also be supported (see **TA 8, Biological Resources – Fish and Other Aquatic Resources**).	Under dry conditions nonmarket values could be impacted as discussed under the no action alternative. Similar to the Enhanced Coordination Alternative, this alternative is more robust in terms of the support for nonmarket values, particularly for values associated with Lake Powell, and for river Based recreation, due to increased stability with flow-dependent activities (see **TA 14, Recreation**).	Outcomes produced by the Supply Driven Alternative (LB Priority approach) vary depending on hydrology and location. In wet years, nonmarket values remain similar to the No Action Alternative but in dry sequences, reduced reservoir elevations and altered flow regimes diminish scenic quality and access for boating and angling (see **TA 14, Recreation**), for Lake Powell. For Lake Mead, the Supply Driven Alternatives (both LB Priority and LB Pro Rata approaches) are the most robust for supporting reservoir levels at Lake Mead which support non-market values. River-based recreation experiences moderate variability in trip quality, while ecosystem services and associated non-use values fluctuate with water availability (see **TA 8, Biological Resources – Fish and Other Aquatic Resources**). Cultural and spiritual values tied to river corridors may also be affected during extended drought periods (see **TA 11, Cultural Resources**).	Impacts would be as described for the Supply Driven Alternative (LB Priority approach).	Under dry conditions nonmarket values could be impacted as discussed under the no action alternative. For values associated with lake-based recreation, modeled results show reduced low-elevation outcomes in Lake Powell and Mead compared to more vulnerable alternatives, but vulnerability remains under drier future hydrologic conditions (**TA 3, Hydrology**). The Representative Preferred Alternative generally performs in the middle of the range of alternatives for both Lake Powell and Lake Mead elevations as well as river flow, showing moderate robustness in terms of overall support for recreation associated benefits (**TA 14, Recreation**). Overall, this alternative would provide moderate protection for riverine habitat to support cultural values (see TA 13, Tribal). The preferred alternative provides a framework that allows for shortage distributions to be negotiated in different ways, consistent with sideboards described in Chapter 2, as a result, impacts for any given sub-period in the planning period may differ from those described.

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

Population and Land Use (See Section 3.17)

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Priority Group: Arizona Central Arizona Project (CAP) non-Indian agriculture (NIA)-A and NIA-B	Percent of modeled futures in which greater than 80% of normal domestic delivery[7] occurs at least 90% of years, across the first decade of the modeling period. The higher the percentage, the more robust an alternative is with respect to achieving normal domestic deliveries.	**0%** of modeled futures meet the performance definition.[4]	**0%** of modeled futures meet the performance definition.[4]	**0%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.
	Percent of modeled futures in which greater than 60% of normal delivery occurs at least 90% of years, across the first decade of the modeling period. The higher the percentage, the more robust an alternative is with respect to achieving normal domestic deliveries.	**0%** of modeled futures meet the performance definition.[4]	**0%** of modeled futures meet the performance definition.[4]	**100%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.
Priority Group: Arizona CAP Indian, municipal and industrial (M&I), and 4(i)	Percent of modeled futures in which greater than 80% of normal domestic delivery[7] occurs at least 90% of years, across the first decade of the modeling period. The higher the percentage, the more robust an alternative is with respect to achieving normal domestic deliveries.	**13%** of modeled futures meet the performance definition.[4]	**0%** of modeled futures meet the performance definition.[4]	**0%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.
	Percent of modeled futures, in which greater than 60% of normal domestic delivery[7] occurs at least 90% of years, across the first decade of the modeling period. The higher the percentage, the more robust an alternative is with respect to achieving normal domestic deliveries.	**100%** of modeled futures meet the performance definition.[4]	**0%** of modeled futures meet the performance definition.[4]	**100%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.
Priority Group: Arizona Priorities 2 and 3	Percent of modeled futures in which greater than 80% of normal domestic delivery[7] occurs at least 90% of years, across the first decade of the modeling period. The higher the percentage, the more robust an alternative is with respect to achieving normal domestic deliveries.	**100%** of modeled futures meet the performance definition.[4]	**100%** of modeled futures meet the performance definition.[4]	**0%** of modeled futures meet the performance definition.	**26%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.	**54%** of modeled futures meet the performance definition.
	Percent of modeled futures, in which greater than 60% of normal domestic delivery[7] occurs at least 90% of years, across the first decade of the modeling period. The higher the percentage, the more robust an alternative is with respect to achieving normal domestic deliveries.	**100%** of modeled futures meet the performance definition.[4]	**100%** of modeled futures meet the performance definition.[4]	**100%** of modeled futures meet the performance definition.	**35%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**58%** of modeled futures meet the performance definition.

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.
[4] Note that these impacts are based on low maximum Lower Basin shortage volumes that translate to higher volumes of dead pool-related reductions (see **Figure TA 4-12**), which could result in significant but highly uncertain impacts.
[7] Normal delivery refers to a full supply of domestic water delivery throughout this table.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Priority Group: Arizona present perfected right (PPR)	Percent of modeled futures in which greater than 80% of normal domestic delivery[7] occurs at least 90% of years, across the first decade of the modeling period. The higher the percentage, the more robust an alternative is with respect to achieving normal domestic deliveries.	**100%** of modeled futures meet the performance definition.[4]	**100%** of modeled futures meet the performance definition.[4]	**0%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.
	Percent of modeled futures, in which greater than 60% of normal domestic delivery[7] occurs at least 90% of years, across the first decade of the modeling period. The higher the percentage, the more robust an alternative is with respect to achieving normal domestic deliveries.	**100%** of modeled futures meet the performance definition.[4]	**100%** of modeled futures meet the performance definition.[4]	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.
Priority Group: California Priority 4	Percent of modeled futures in which greater than 80% of normal domestic delivery[7] occurs at least 90% of years, across the first decade of the modeling period. The higher the percentage, the more robust an alternative is with respect to achieving normal domestic deliveries.	**100%** of modeled futures meet the performance definition.[4]	**100%** of modeled futures meet the performance definition.[4]	**0%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.
	Percent of modeled futures, in which greater than 60% of normal domestic delivery[7] occurs at least 90% of years, across the first decade of the modeling period. The higher the percentage, the more robust an alternative is with respect to achieving normal domestic deliveries.	**100%** of modeled futures meet the performance definition.[4]	**100%** of modeled futures meet the performance definition.[4]	**100%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.
[4] Note that these impacts are based on low maximum Lower Basin shortage volumes that translate to higher volumes of dead pool-related reductions (see **Figure TA 4-12**), which could result in significant but highly uncertain impacts.
[7] Normal delivery refers to a full supply of domestic water delivery throughout this table.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Priority Group: California PPR	Percent of modeled futures in which greater than 80% of normal domestic delivery[7] occurs at least 90% of years, across the first decade of the modeling period. The higher the percentage, the more robust an alternative is with respect to achieving normal domestic deliveries.	**100%** of modeled futures meet the performance definition.[4]	**100%** of modeled futures meet the performance definition.[4]	**0%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.
	Percent of modeled futures, in which greater than 60% of normal domestic delivery[7] occurs at least 90% of years, across the first decade of the modeling period. The higher the percentage, the more robust an alternative is with respect to achieving normal domestic deliveries.	**100%** of modeled futures meet the performance definition.[4]	**100%** of modeled futures meet the performance definition.[4]	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.
Priority Group: Nevada Priorities 1-7	Percent of modeled futures in which greater than 80% of normal domestic delivery[7] occurs at least 90% of years, across the first decade of the modeling period. The higher the percentage, the more robust an alternative is with respect to achieving normal domestic deliveries.	**100%** of modeled futures meet the performance definition.[4]	**100%** of modeled futures meet the performance definition.[4]	**0%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**18%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.
	Percent of modeled futures, in which greater than 60% of normal domestic delivery[7] occurs at least 90% of years, across the first decade of the modeling period. The higher the percentage, the more robust an alternative is with respect to achieving normal domestic deliveries.	**100%** of modeled futures meet the performance definition.[4]	**100%** of modeled futures meet the performance definition.[4]	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.

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[4] Note that these impacts are based on low maximum Lower Basin shortage volumes that translate to higher volumes of dead pool-related reductions (see **Figure TA 4-12**), which could result in significant but highly uncertain impacts.
[7] Normal delivery refers to a full supply of domestic water delivery throughout this table.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Priority Group: Nevada Priority 8	Percent of modeled futures in which greater than 80% of normal domestic delivery[7] occurs at least 90% of years, across the first decade of the modeling period. The higher the percentage, the more robust an alternative is with respect to achieving normal domestic deliveries.	**100%** of modeled futures meet the performance definition.[4]	**0%** of modeled futures meet the performance definition.[4]	**0%** of modeled futures meet the performance definition.	**1%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.	**18%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.
	Percent of modeled futures, in which greater than 60% of normal domestic delivery[7] occurs at least 90% of years, across the first decade of the modeling period. The higher the percentage, the more robust an alternative is with respect to achieving normal domestic deliveries.	**100%** of modeled futures meet the performance definition.[4]	**100%** of modeled futures meet the performance definition.[4]	**100%** of modeled futures meet the performance definition.	**22%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**54%** of modeled futures meet the performance definition.
Lower Basin Domestic Water Deliveries	Percent of modeled futures in which dead pool-related delivery reductions occur, across the first decade of the modeling period (2027 – 2039)	**59%** of modeled futures with dead pool-related reductions	**32%** of modeled futures with dead pool-related reductions	**12%** of modeled futures with dead pool-related reductions	**6%** of modeled futures with dead pool-related reductions	**23%** of modeled futures with dead pool-related reductions	**12%** of modeled futures with dead pool-related reductions	**8%** of modeled futures with dead pool-related reductions

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.
[4] Note that these impacts are based on low maximum Lower Basin shortage volumes that translate to higher volumes of dead pool-related reductions (see **Figure TA 4-12**), which could result in significant but highly uncertain impacts.
[7] Normal delivery refers to a full supply of domestic water delivery throughout this table.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Comparison of impacts on senior and junior entitlements	Shortage to domestic water users, across the first decade of the modeling period	>80% of normal domestic water delivery to senior entitlements (Arizona (AZ) P2 & P3; AZ PPR; California (CA) PPR; and Nevada (NV) P1-7 priority groups) and some junior entitlements (CA P4 and NV P8 priority groups) occurs in all potential futures. In contrast, for Arizona junior entitlements (AZ CAP NIA-A and NIA-B; AZ CAP Indian, M&I, and 4(i) priority groups) there are no potential futures in which >80% normal domestic water delivery occurs.[4] AZ CAP Indian, M&I, and 4(i) receives >60% of normal domestic water delivery in all potential futures There are no potential futures in which Arizona CAP NIA-A and NIA-B priorities receive any percentage of normal domestic water delivery. While this alternative results in all senior priority groups and some Arizona, California, and Nevada junior priority groups receiving domestic water delivery closest to normal conditions, it results in severe domestic shortage impacts to Arizona CAP NIA-A and NIA-B.	>80% of normal domestic water delivery to senior entitlements (AZ P2 & P3; AZ PPR; CA PPR; and NV P1-7 priority groups) and some junior entitlements (CA P4 priority group) occurs in all potential futures. In contrast, for Arizona and Nevada junior entitlements (AZ CAP NIA-A and NIA-B; AZ CAP Indian, M&I, and 4(i); and NV P8 priority groups) there are no potential futures in which >80% normal domestic water delivery occurs.[4] NV P8 receives >60% of normal domestic water delivery in all potential futures. There are no potential futures in which Arizona junior priority receive any percentage of normal domestic water delivery. While this alternative results in all senior priority groups and some California junior priority groups receiving domestic water delivery closest to normal conditions, it results in severe domestic shortage impacts to Arizona junior priority groups.	>60% of normal domestic water delivery to all Arizona, California, and Nevada priority groups occurs in all potential futures. While this alternative results in more priority groups receiving domestic water delivery closer to normal conditions, it results in domestic shortage impacts on Arizona, California, and Nevada senior entitlements that would otherwise receive domestic water deliveries consistent with normal conditions.	>80% of normal domestic water delivery to some senior priority groups (AZ PPR; CA PPR; and NV P1-7 priority groups) occurs in all potential futures. In contrast, for all Arizona, California, and Nevada junior entitlements (AZ CAP NIA-A and NIA-B; AZ CAP Indian, M&I, and 4(i); CA P4; and NV P8 priority groups) there are no potential futures, in which >80% of normal domestic water delivery occurs. AZ P2 & P3 receives >60% and >80% of normal delivery in 26% and 35% of potential futures, respectively. NV P8 receives >60% and >80% of normal domestic water delivery in 1% and 22% of potential futures, respectively. There are no potential futures in which Arizona and California junior entitlements receive any percentage of normal domestic water delivery. While this alternative results in Arizona and California PPR and Nevada senior priority groups receiving domestic water delivery closest to normal conditions, it results in severe domestic shortage impacts to all Arizona and California junior priority groups.	>80% of normal domestic delivery to some senior entitlements (AZ P2 & P3; AZ PPR; CA PPR; and NV P1-7 priority groups) occurs in all potential futures. In contrast, for junior entitlements (AZ CAP NIA-A and NIA-B; AZ CAP Indian, M&I, and4(i); CA P4; and NV P8 priority groups), there are no potential futures, in which >80% of normal domestic water delivery occurs. NV P8 receives >60% of normal domestic water delivery in all potential futures. AZ CAP Indian, M&I, and 4 (i) receives >20% of normal domestic water delivery in 31-40% of potential futures. There are no potential futures in which Arizona CAP NIA-A and NIA-B and CA P4 priority groups receive any percentage of normal domestic water delivery. While this alternative results in all senior priority groups receiving domestic water delivery closest to normal conditions, it results in severe domestic shortage impacts to some Arizona and California junior priority groups.	>80% normal domestic water delivery occurs in all potential futures for all California priority groups. >60% of normal domestic delivery to all Arizona and Nevada priority groups occurs in all potential futures. While this alternative results in more Arizona junior priority groups receiving domestic delivery closer to normal conditions, it results in domestic shortage impacts on Arizona and Nevada senior entitlements that would otherwise receive deliveries consistent with normal conditions.	>80% of normal domestic water delivery to some senior priority groups (AZ PPR; CA PPR; and NV P1-7 priority groups) occurs in all potential futures. In contrast, for all Arizona, California, and Nevada junior entitlements (AZ CAP NIA-A and NIA-B; AZ CAP Indian, M&I, and 4(i); CA P4; and NV P8 priority groups) there are no potential futures, in which >80% of normal domestic water delivery occurs. AZ P2 & P3 receives >60% and >80% of normal delivery in 54% and 58% of potential futures, respectively. NV P8 receives >60% and >80% of normal domestic water delivery in 0% and 51% of potential futures, respectively. There are no potential futures in which Arizona and California junior entitlements receive any percentage of normal domestic water delivery. While this alternative results in Arizona and California PPR and Nevada senior priority groups receiving domestic water delivery closest to normal conditions, it results in domestic shortage impacts to all Arizona and California junior priority groups.

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

[4] Note that these impacts are based on low maximum Lower Basin shortage volumes that translate to higher volumes of dead pool-related reductions (see **Figure TA 4-12**), which could result in significant but highly uncertain impacts.

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
How would operational changes affect irrigated agricultural land?	Acres of irrigated agricultural land within the analysis area and potential for changes based on agricultural water availability	Frequent and severe shortages for junior-priority irrigation users likely lead to fallowing, crop switching, and long-term land retirement in Arizona counties (La Paz, Mohave and Yuma); Imperial Valley impacts are more limited.	Concentrated impacts for junior users in Arizona still drive significant agricultural land use changes; California and senior priority holders see limited more limited impacts	Pro rata distribution mitigates concentrated impacts for junior users but introduces broader reductions, increasing risk of widespread crop switching and fallowing in both Arizona and California.	Large shortage volumes and reliance on conservation participation create high uncertainty; potential for extensive land retirement if participation is low.	Concentrates impacts on junior users, preserving senior districts but accelerating land use change in Arizona counties (La Paz, Mohave and Yuma).	Distributes shortages broadly, increasing exposure for senior priority holders California and potentially leading to widespread fallowing and crop switching across the Basin.	The representative preferred alternative for 2027-2028 would result in shortages, with impacts concentrated on junior users. In the longer term (2029-2060) modeled outcomes indicate potential for additional fallowing land and crop switching, with impacts concentrated on junior users. However, the distribution of shortage under any specific operating guidelines adopted under the Preferred Alternative decision framework may differ from the priority distribution method reflected here for the Representative Preferred Alternative, as a result, the potential for fallowing, crop switching, and other associated long term land - use patterns in any given area may vary and impacts may be mitigated in part by specific operational guidelines

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

Indian Trust Assets (See Section 3.18)

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Upper Basin Tribal Water Deliveries	Typical Water Deliveries	The alternatives act the same in terms of Upper Basin tribal water deliveries.						
Lower Basin Tribal Water Deliveries	Percent of modeled futures in which *dead pool-related delivery reductions never occur in 2027-2039*	**41%** of modeled futures do not have dead pool-related reductions.	**68%** of modeled futures do not have dead pool-related reductions.	**88%** of modeled futures do not have dead pool-related reductions.	**94%** of modeled do not have dead pool-related reductions.	**77%** of modeled futures do not have dead pool-related reductions.	**88%** of modeled futures do not have dead pool-related reductions.	**95%** of modeled futures do not have dead pool-related reductions.
Lower Basin Tribal Water Deliveries (Group of tribes with PPR rights)	At least 80% of Normal Water Deliveries (i.e., non-shortage conditions) occurs in at least 90% of years across 2027-2039. The higher the percentage, the more frequently deliveries are estimated to remain consistent with normal delivery.	**100%** of modeled futures meet the minimum preferred performance.[4]	**100%** of modeled futures meet the minimum preferred performance.[4]	**0%** of modeled futures meet the minimum preferred performance.	**100%** of modeled futures meet the minimum preferred performance.	**100%** of modeled futures meet the minimum preferred performance.	**0%** of modeled futures meet the minimum preferred performance.	**100%** of modeled futures meet the minimum preferred performance.
Lower Basin Tribal Water Deliveries (Group of tribes with AZ Priority 3 entitlements)	At least 80% of Normal Water Deliveries (i.e., non-shortage conditions) occurs in at least 90% of years across 2037-2039. The higher the percentage, the more frequently deliveries are estimated to remain consistent with normal delivery.	**100%** of modeled futures meet the minimum preferred performance.[4]	**100%** of modeled futures meet the minimum preferred performance.[4]	**0%** of modeled futures meet the minimum preferred performance.	**60%** of modeled futures meet the minimum preferred performance.	**100%** of modeled futures meet the minimum preferred performance.	**0%** of modeled futures meet the minimum preferred performance.	**65%** of modeled futures meet the minimum preferred performance.
Lower Basin Tribal Water Deliveries (Group of tribes with Arizona CAP Indian, M&I, and 4i entitlements)	At least 80% of Normal Water Deliveries (i.e., non-shortage conditions) occurs in at least 90% of years across 2037-2039. The higher the percentage, the more frequently deliveries are estimated to remain consistent with normal delivery.	**100%** of modeled futures meet the minimum preferred performance.[4]	**0%** of modeled futures meet the minimum preferred performance.[4]	**0%** of modeled futures meet the minimum preferred performance.	**0%** of modeled futures meet the minimum preferred performance.	**0%** of modeled futures meet the minimum preferred performance.	**0%** of modeled futures meet the minimum preferred performance.	**0%** of modeled futures meet the minimum preferred performance.
Lower Basin Tribal Water Deliveries (Group of tribes with Arizona CAP Non-Indian Agriculture entitlements)	At least 80% of Normal Water Deliveries (i.e., non-shortage conditions) occurs in at least 90% of years across 2037-2039. The higher the percentage, the more frequently deliveries are estimated to remain consistent with normal delivery.	**0%** of modeled futures meet the minimum preferred performance.[4]	**0%** of modeled futures meet the minimum preferred performance.[4]	**0%** of modeled futures meet the minimum preferred performance.	**0%** of modeled futures meet the minimum preferred performance.	**0%** of modeled futures meet the minimum preferred performance.	**0%** of modeled futures meet the minimum preferred performance.	**0%** of modeled futures meet the minimum preferred performance.
Trust Land (Arizona)	Acres of Fallowed Tribal Land	12,419 [4]	12,419 to 49,582 [4]	8,067 to 39,200	6,535 to 68,054	6,535 to 53,560	15,794 to 38,605	6,535 to 67,375 [4]
Trust Land (California)	Acres of Fallowed Tribal Land	0 [4]	0 [4]	1,298 to 5,092	0	0	579 to 2,803	0 [4]
Trust Land (Nevada)	Acres of Fallowed Tribal Land	0 [4]	0 [4]	131 to 656	0	0	131 to 460	0 [4]

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

[4] Note that these impacts are based on low maximum Lower Basin shortage volumes that translate to higher volumes of dead pool-related reductions (see **Figure TA 4-12**), which could result in significant but highly uncertain impacts.

Visual Resources (See Section 3.19)

Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Visibility of Attraction Features	Percent of futures in which *Lake Powell elevation is below 3,550 feet in at least 90% of months*. The higher the percentage, the more likely Lake Powell will remain at elevations where Cathedral in the Desert is visible and accessible.	**82%** of modeled futures meet *the preferred minimum performance*. **Most acceptable** futures where Cathedral in the Desert is visible and accessible.	**78%** of modeled futures meet *the preferred minimum performance*. **Second most acceptable** futures where Cathedral in the Desert is visible and accessible.	**52%** of modeled futures meet *the preferred minimum performance*. **Fewest acceptable** futures where Cathedral in the Desert is visible and accessible.	**59%** of modeled futures meet *the preferred minimum performance*. **Second fewest** acceptable futures where Cathedral in the Desert is visible and accessible.	**77%** of modeled futures meet *the preferred minimum performance*. **Third most acceptable futures** where Cathedral in the Desert is visible and accessible.		**75%** of modeled futures meet *the preferred minimum performance*. **Fourth most acceptable futures** where Cathedral in the Desert is visible and accessible.
	Percent of futures in which *Lake Powell elevation is above 3,550 feet at least 90% of months*. The higher the percentage, the more likely less of Glen Canyon Dam will be visible. Hoover Dam visibility is based on modeling associated with the next issue statement.	**18%** of modeled futures meet *the preferred minimum performance*. **Fewest** futures where less of Glen Canyon and Hoover dams would be visible, with their increased visibility further dominating the local landscape character.	**22%** of modeled futures meet *the preferred minimum performance*. **Second fewest** futures where less of Glen Canyon Dam would be visible, with its increased visibility further dominating the local landscape character with less of Hoover Dam visible compared to the No Action.	**48%** of modeled futures meet *the preferred minimum performance*. **Most acceptable futures** where less of Glen Canyon and Hoover dams would be visible, reducing their level of dominance in the local landscape compared to the No Action	**41%** of modeled futures meet *the preferred minimum performance*. **Second most acceptable** futures where less of Glen Canyon and Hoover dams would be visible, reducing their level of dominance in the local landscape compared to the No Action.	**23%** of modeled futures meet *the preferred minimum performance*. **Third fewest** futures where less of Glen Canyon Dam would be visible, with its increased visibility further dominating the local landscape character. Based on managing higher reservoir levels in Lake Mead compared to Lake Powell under this alternative, less of the upstream side of Hoover Dam would be visible under this alternative (similar to the Enhanced Coordination and Maximum Flexibility alternatives) with comparatively more of the upstream side of Glen Canyon Dam being visible as described above.		**25%** of modeled futures meet *the preferred minimum performance*. **Third most** futures where less of Glen Canyon Dam would be visible, with its increased visibility further dominating the local landscape character with less of Hoover Dam visible compared to the No Action.

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Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Lake Powell and Lake Mead landscape character	Percent of futures in which ***Lake Powell*** *elevation would result in calcium carbonate rings remaining under historic maximums for 100% of the modeling period*. Based on updated modeling, the analysis focused on a threshold of 200 feet instead of the historic maximum. The higher the percentage, the more likely calcium carbonate rings at Lake Powell will remain shorter than historic maximums.	**4%** of modeled futures meet *the preferred minimum performance*.	**19%** of modeled futures meet *the preferred minimum performance*.	**81%** of modeled futures meet *the preferred minimum performance*.	**94%** of modeled futures meet *the preferred minimum performance*.	**35%** of modeled futures meet *the preferred minimum performance*.		**45%** of modeled futures meet *the preferred minimum performance*.
	Percent of futures in which ***Lake Mead*** *elevation would result in calcium carbonate rings remaining under historic maximums for 100% of the modeling period*. Based on updated modeling, the analysis focused on a threshold of 200 feet instead of the historic maximum. The higher the percentage, the more likely calcium carbonate rings at Lake Mead will remain shorter than historic maximums.	**8%** of modeled futures meet *the preferred minimum performance*.	**20%** of modeled futures meet *the preferred minimum performance*.	**17%** of modeled futures meet *the preferred minimum performance*.	**22%** of modeled futures meet *the preferred minimum performance*.	**44%** of modeled futures meet *the preferred minimum performance*.		**23%** of modeled futures meet *the preferred minimum performance*.
Colorado River landscape character	Qualitative description of the effect associated with proposed flow rates and the potential to conduct HFEs from Glen Canyon Dam under each alternative.	Initially, there would be less impacts as flows would remain above 7.0 maf; however, if Lake Powell reaches dead pool, impacts would be extensive and immediate due to a dramatic reduction in flows. The current trends of increasing bank armoring, associated with expanding riparian vegetation areas (including tamarisk), would continue under the No Action Alternative. This alternative has the **fewest futures** where HFEs are conducted during the full modeling period.	Impacts would be similar to the No Action since it includes a similar range of releases from Glen Canyon Dam. This alternative would have an **increased number of futures** where HFEs are conducted compared to the No Action Alternative.	Based on yearly projections, if releases as low as 4.7 maf are needed, there would be increased impacts on the river's landscape character. If releases are above 7.0 maf, impacts would be the same as the No Action Alternative. This alternative would result in the **second most futures** where HFEs are conducted.	Based on yearly projections, if releases as low as 5.0 maf are needed, there would be increased impacts on the river's landscape character. If releases are above 7.0 maf, impacts would be the same as the No Action Alternative. This alternative would result in the **most futures** where HFEs are conducted.	Based on yearly projections, if releases as low as 4.7 maf are needed, there would be increased impacts on the river's landscape character. If releases are above 7.0 maf, impacts would be the same as the No Action Alternative. This alternative has the **second fewest futures** where HFEs are conducted during the full modeling period.		Based on yearly projections, if releases as low as 6.0 maf are needed, there would be increased impacts on the river's landscape character. If releases are above 7.0 maf, impacts would be the same as the No Action Alternative. This alternative has the **second fewest futures** where HFEs are conducted during the full modeling period similar to the Supply Driven Alternative.

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Impact Category	Performance Indicator[1]	Impacts Summary						
		No Action Alternative	Basic Coordination Alternative	Enhanced Coordination Alternative	Maximum Operational Flexibility Alternative	Supply Driven Alternative (LB Priority)	Supply Driven Alternative (LB Pro Rata)	Representative Preferred Alternative
Lower Division States' landscape character	Qualitative description of the effects associated with potential decreases in water availability for the Lower Division States on the broader landscape character including the potential to reach dead pool.	Initially, there would be lower impacts; however, if Lake Mead reaches dead pool, dramatic decreases in water availability could affect the landscape character in all three Lower Division States. Depending on the duration of these decreased water deliveries, the character of irrigated and agricultural landscapes within the Lower Division States would be modified through aridification of these areas; this would diminish the vivid greens associated with crops and ornamental plantings. This alternative has the **most futures** where dead pool shortage is reached.	Impacts would be similar to the No Action except this alternative includes increased shortages to Arizona and Nevada (up to 1.48 maf). While the potential to reach dead pool is reduced under this alternative, compared to the No Action Alternative, there is still a risk to reach dead pool under some futures. This alternative has the **second most futures** where dead pool shortage is reached.	Shortages up to 3.0 maf are possible under this alternative, which would incrementally affect all three Lower Division States including irrigated and agricultural landscapes. These shortages are designed to avoid reaching dead pool, tempering the impacts on the character of irrigated and agricultural landscapes within the Lower Division States and avoid more extensive impacts if Lake Mead reached dead pool. This alternative has the **second fewest** futures where dead pool shortage is reached.	Shortages up to 4.0 maf are possible under this alternative, which would incrementally affect all three Lower Division States including irrigated and agricultural landscapes. The shortages are designed to avoid reaching dead pool. This alternative has the **fewest futures** where dead pool shortage is reached.	Shortages up to 2.1 maf are possible under this alternative, which would incrementally affect all three Lower Division States including irrigated and agricultural landscapes. The shortages are designed to avoid reaching dead pool. This alternative, similar to the Enhanced Coordination Alternative, has the **second fewest futures** where dead pool shortage is reached.		Shortages up to 3.0 maf are possible under this alternative, which would incrementally affect all three Lower Division States including irrigated and agricultural landscapes. The shortages are designed to avoid reaching dead pool. This alternative, similar to the Enhanced Coordination Alternative, has the **second fewest futures** where dead pool shortage is reached.

[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

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[1] Some performance indicator descriptions include italics to denote a definition of the "*preferred minimum performance*" that was used as a significant reference point for technical analysis. The following were considered when determining preferred minimum performance: input from resource experts, the severity of negative outcomes associated with not satisfying a given performance level, historical (observed) data, and/or reasonably expected outcomes if current operations and recent hydrology continued. To find more information about preferred minimum performance levels, see Volume III – Technical Appendices.

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