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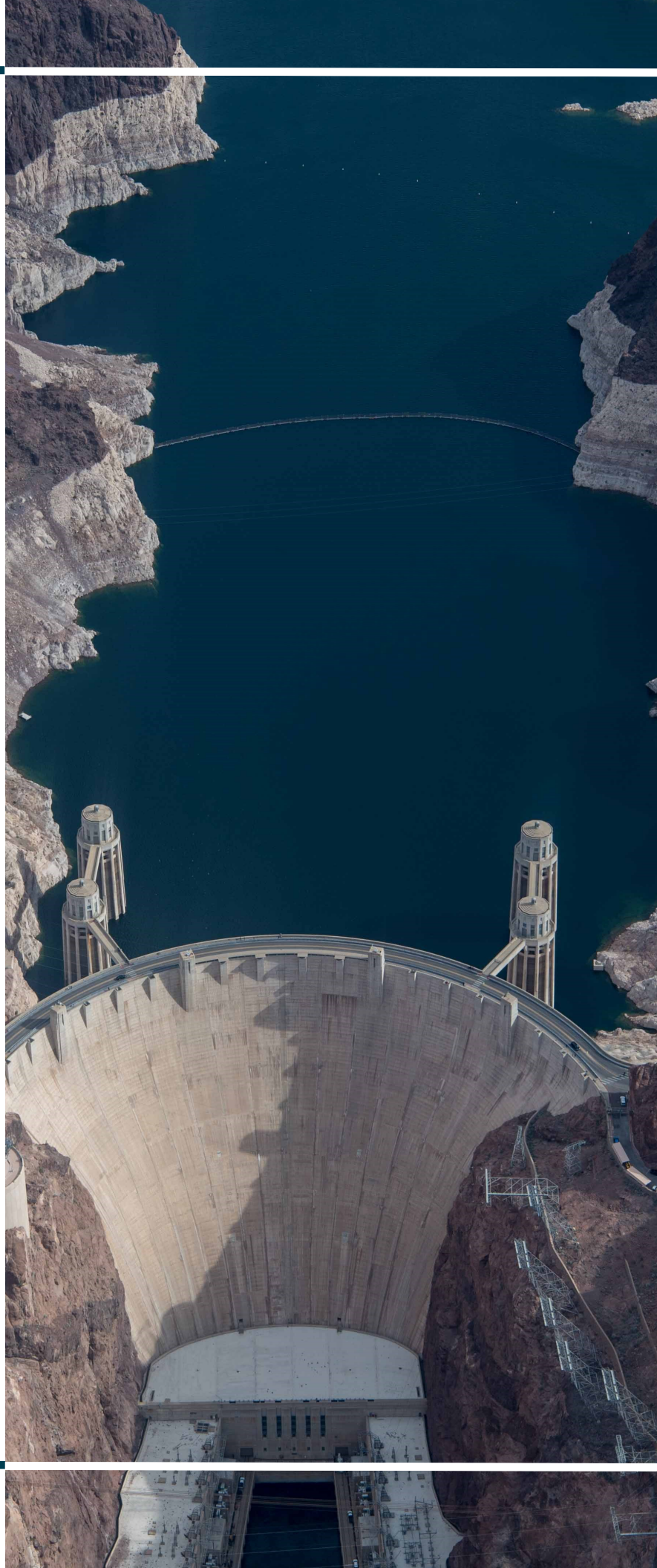
Draft
Environmental Impact Statement

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

Executive Summary



January 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.

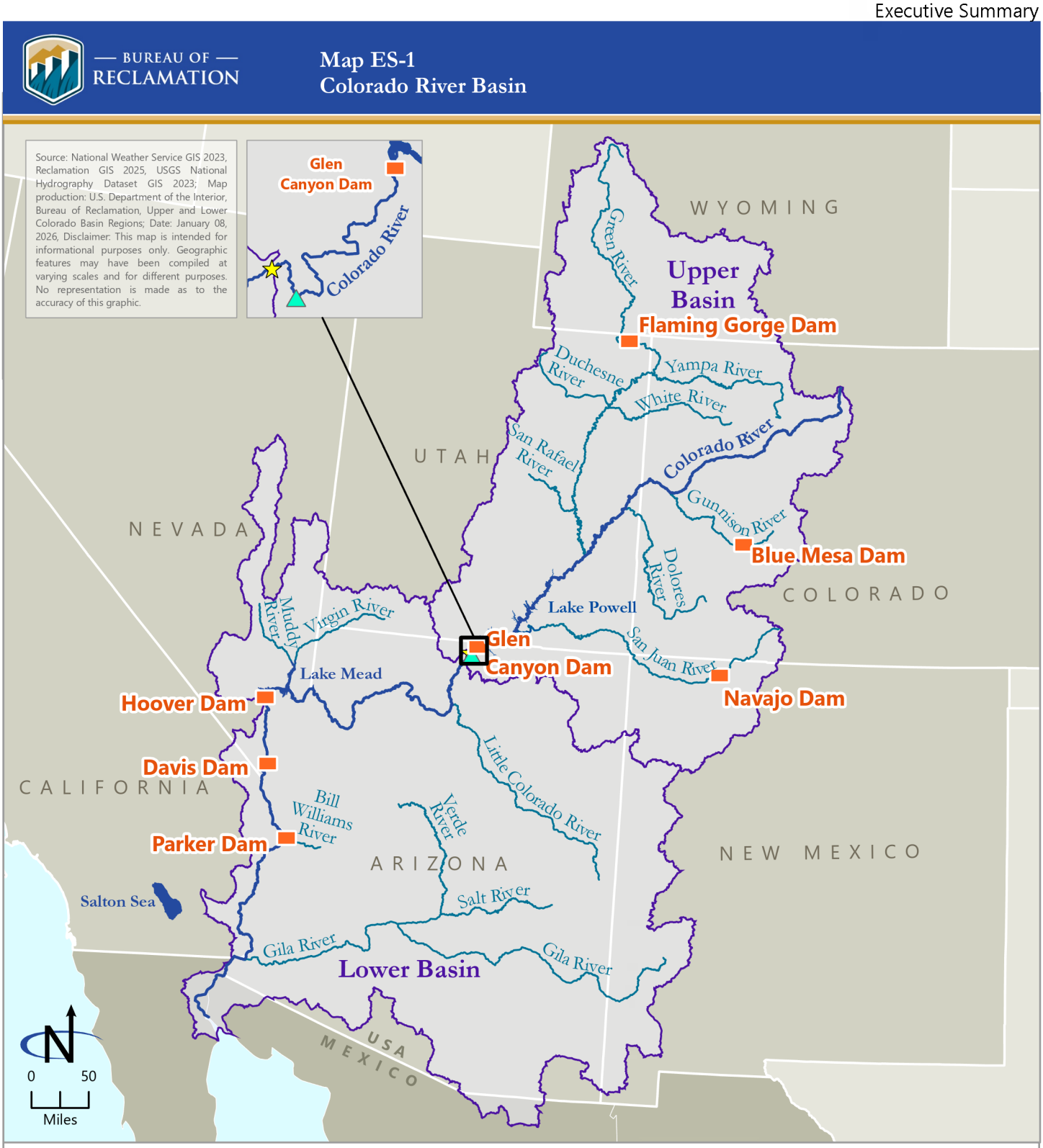
Photo by Reclamation, unknown date

Executive Summary

ES.1 Background

Prudent management of the Colorado River Basin (Basin) is crucial 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 United States 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.

The Secretary (Secretary) of the Department of the Interior (Department), 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 range 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 and approaches to enhance opportunities for Lower Basin water users to reduce water use (see **Map ES-1**). This Draft EIS has been prepared to inform the Secretary's timely adoption of a new set of guidelines that would be sufficiently robust and provide improved 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 Draft 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 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: January 08, 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
ARIZONA
NEW MEXICO
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)

Given the magnitude of the tradeoffs and the considerable hydrologic uncertainty, and recognizing the important operating experience gained during the current interim period, the Secretary proposes that these new guidelines also be interim in duration to gain additional operating experience. To provide stability and predictability to Basin water users, the Secretary intends that the interim period extend approximately 20 years; however, given the ongoing efforts toward achieving consensus among various Basin entities regarding appropriate post-2026 operations, the Secretary remains open to a shorter duration or phased implementation as part of a longer-term framework.

Reclamation, as the agency that is 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 pursuant to 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 Environmental Impact Statement (EIS). The cooperating agencies are the Bureau of Indian Affairs, United States Fish and Wildlife Service, National Park Service (NPS), Western Area Power Administration, and the United States Section of the International Boundary and Water Commission. The EIS is organized into three 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 Reclamation's engagement with stakeholders, how alternatives were developed and considered, and a detailed overview of all alternatives evaluated in the EIS.
>
> 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 Draft EIS.

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.

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 (LROC) 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, 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 for 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, storage, and delivery of water supplies in Colorado River reservoirs
- 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 specific 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.
- Emergency response operations at upstream CRSP reservoirs 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. Given the ongoing efforts toward achieving consensus among various Basin entities regarding appropriate post-2026 operations, the Secretary remains open to a shorter duration or phased implementation as part of a longer-term framework.

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 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 FEIS, 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 Colorado River floodplain.

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 Draft EIS. These activities include Upper Basin conservation and, if warranted to protect critical reservoir elevations, operations at the CRSP Upper Initial Units. Operations at the CRSP Upper Initial Units specifically contemplated in the Draft EIS alternatives are intended to remain within the scope of the existing Records of Decision (RODs). [1] Accordingly, the Draft EIS does not expand the geographic scope of analysis upstream of Lake Powell. With respect to Upper Basin

[1] 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 Draft 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.

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, including the Basin States,[2] Basin Tribes, conservation organizations, other federal agencies, and members of the public. Reclamation solicited input on considerations for alternatives during pre-scoping and scoping periods in 2022 and 2023 and worked collaboratively with Basin stakeholders to identify a range of alternatives throughout 2024 and 2025.

During the public involvement periods and the subsequent alternatives development process, Reclamation received considerable input from the Basin States, many Basin Tribes,[3] conservation organizations, other federal agencies, other stakeholders, and members of the public. Input submitted ranged from detailed proposed alternatives to operational concepts and principles. Throughout the alternatives development phase, Reclamation conducted over 100 meetings with states, tribes, and other partners to review and discuss their input. For those proposals containing sufficient detail to be considered as a full alternative or a major component of an alternative, Reclamation worked extensively with these entities to not only understand and gather additional information, but also to model and perform preliminary analyses of their proposals to facilitate refinements. Additionally, Reclamation developed and hosted 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.

Despite this extensive engagement, a consensus-based approach to Basin reservoir operations has not yet been achieved and therefore, Reclamation has not identified a Preferred Alternative in this Draft EIS. Since 1970, the Basin States have supported operations and reached agreements among themselves and with the Secretary on various aspects of Colorado River reservoir operations. It is beyond question that achieving a consensus-based approach to Basin reservoir operations has

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

[3] There are 30 federally recognized Native American Tribes in the Colorado River 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.

proved critical to the long-term operating success of the Basin. Given the importance of a consensus-based approach to operations in terms of the stability of the system, the Department will continue to pursue an agreement among various Basin entities. Should a consensus emerge following the publication of this Draft EIS, Reclamation anticipates that such an agreement will incorporate elements or variations of these Draft EIS alternatives and will be fully analyzed in the Final EIS.

ES.2.2 Alternatives

This Draft EIS includes the following five alternatives that capture an appropriately board range of operational elements and potential environmental impacts:

- No Action Alternative
- Basic Coordination Alternative
- Enhanced Coordination Alternative
- Maximum Operational Flexibility Alternative
- Supply Driven Alternative

Three of the alternatives directly reflect proposals and concepts received from, and refined through, stakeholder engagement. Specifically, a group of Basin Tribes and other federal agencies informed Reclamation's development of the Enhanced Coordination Alternative and the Maximum Operational Flexibility Alternative is based on a proposal from a consortium of conservation organizations. The Supply Driven Alternative incorporates concepts from the separate proposals submitted by the Upper Division and Lower Division States, as well as ideas emerging from discussions with the Basin States during spring 2025. Reclamation developed the Basic Coordination Alternative to provide a compliance option for a set of operations that could be implemented in 2027 if no new agreements among Basin water users are adopted.

The Secretary has the vested authority and responsibility to operate the System through coordinated operations, including the ability to respond to exigent and emergency conditions, pursuant to applicable federal law, the Decree, contractual obligations, and other elements of the Law of the River. The full extent of Reclamation's operational authority has not been tested to date—either operationally or through legislative or judicial review. The primary reason for this is that management of the river has been based on agreements among Basin water users. In most cases, Reclamation's authority to fully implement the agreements has not been in question; however, specific operational mechanisms negotiated as part of the 2019 Drought Contingency Plan required congressional legislation[4] to fully implement.

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

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

Each alternative is comprised of four operational elements reflective of the proposed federal action: (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 reasonable and broad range of Colorado River operations that capture an appropriate range of potential environmental impacts. Based on the analysis in and public review of this Draft EIS, Reclamation may refine these Draft EIS alternatives or develop additional alternatives for the Final EIS.

Summary descriptions of the No Action Alternative and the four action alternatives considered and evaluated in the Draft EIS are provided in **Table ES-1**.

Table ES-1
Summary Comparison of Alternatives

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 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, 500, and 600 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 United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

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

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

Enhanced Coordination Alternative

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

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

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

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 11.0 maf to 5.0 maf and would be determined by total CRSP system storage and recent hydrology. Releases would switch to "run-of-river" when Lake Powell is at 3,510 feet or lower. The operations incorporate Basin-wide shared contributions, including up to 4.0 maf of shortages in the Lower Basin triggered by combined seven-reservoir storage (CRSP Units, Lake Mead, Lake Mohave, and Lake Havasu) and recent hydrology and voluntary water contributions from both basins.

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 11.0 to 5.0 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 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 United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

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

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

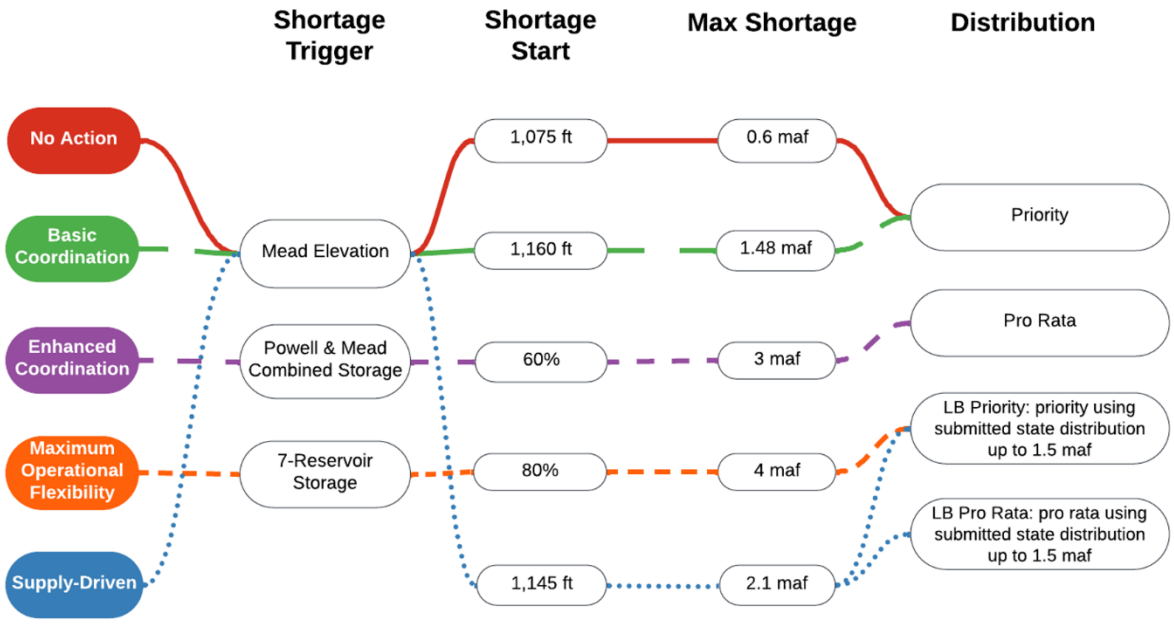
ES.2.3 Range of Alternatives

The Draft EIS incorporates a reasonable and broad range of alternatives in accordance with NEPA. It is important that the range is sufficient to cover reasonable permutations of operations and provide flexibility to incorporate public input between the Draft and Final EIS. 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.

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

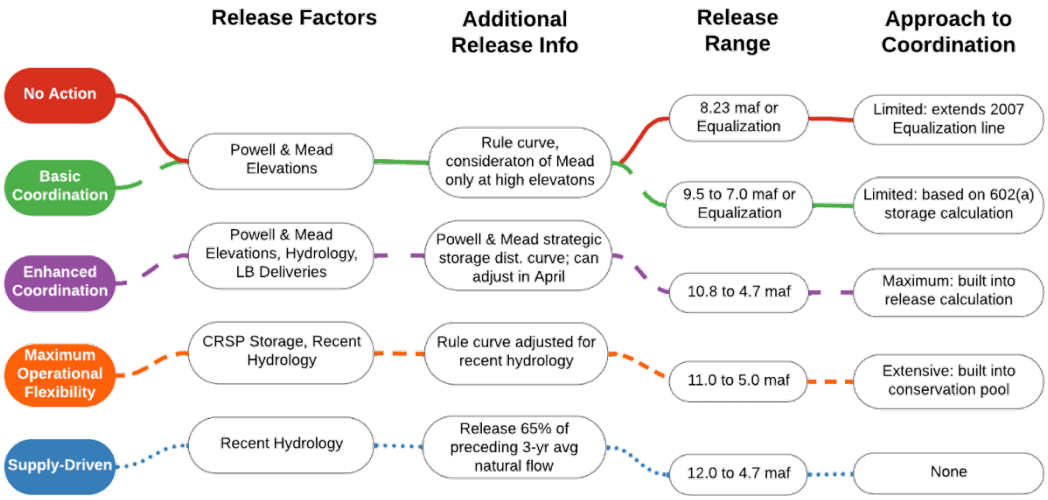


Notes: Additional restrictions in water deliveries will occur when Lake Mead is near dead pool, resulting in large reductions (referred to as "dead-pool related reductions"). These are not considered an operational element of the alternatives.
Shortage volumes include modeling assumptions for reductions in water deliveries to Mexico. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy regarding deliveries to Mexico. The United States will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State.

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).

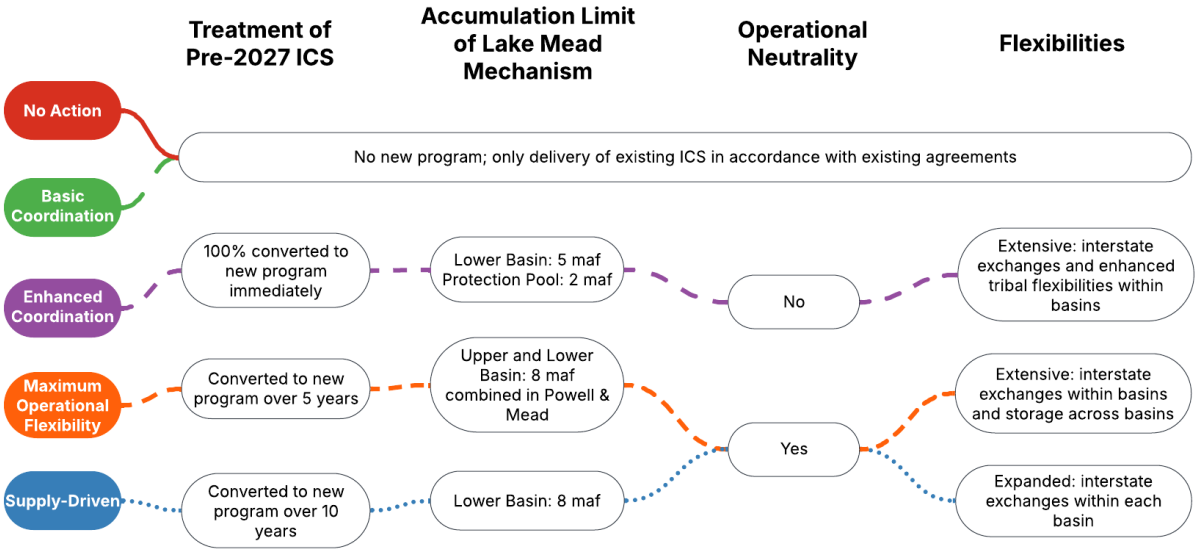
Figure ES-2
Coordinated Reservoir Operations



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



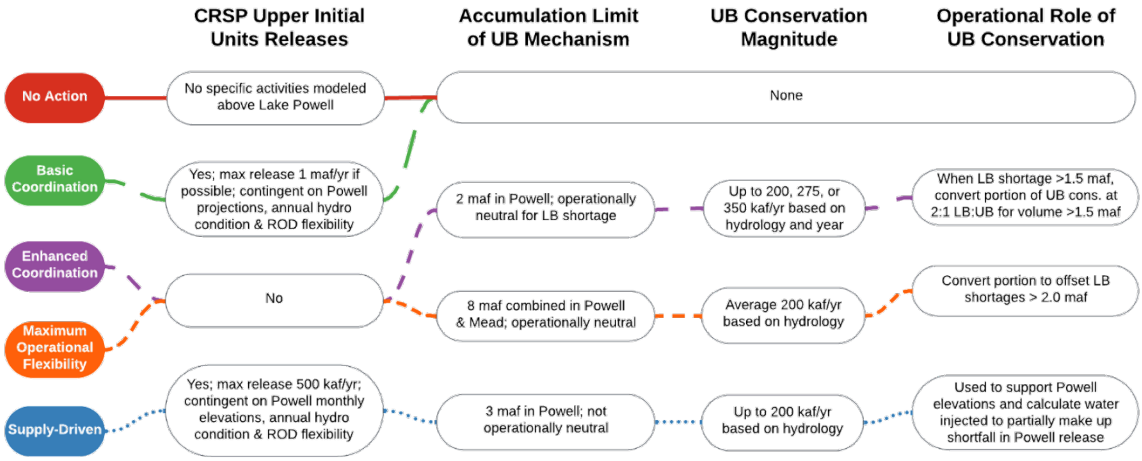
Note: Accumulation limits include modeling assumptions for storage available to Mexico. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current United States policy or a determination of future United States policy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

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,[5] 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.

[5] 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.

Figure ES-4
Activities Above Lake Powell



ES.3 Potential Environmental Effects

ES.3.1 Analysis Methods

The analysis for this Draft 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 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 1,200 potential futures that cover a wide range of hydrologic conditions and incorporate multiple sets of initial reservoir conditions that account for uncertainty about where the system will be in January 2027 when the new guidelines would take effect. 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-8**, 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 Key Tradeoffs and Conclusions

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 for long-term and near-term outlooks.

ES.4.1 Overview of Long-term Performance in Key Metrics

Figure ES-5 summarizes how the alternatives and the Continued Current Strategies Comparative Baseline[6] (labeled Cont. Current in the following figures and tables) perform over the next 20 years in five metrics that are represented by vertical axes. The metrics are described in **Table ES-2**. While there are many important metrics across Basin resources, these summarize the high-level system impacts that propagate through all resources. As described in **Table ES-2**, these elevations have

[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.

particular 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-2** (i.e., 3,500 feet and 975 feet) do not represent an operational decision for actual implementation; rather, they are used solely for analytical purposes in this Draft EIS.

Table ES-2
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 infrastructure may be critically impacted and hydropower cannot be produced at Glen Canyon Dam
Percent of months in which Lake Mead stays above elevation 975 feet	Elevation 975 feet provides a buffer above 950 feet, below which infrastructure may be critically impacted and hydropower cannot be produced at Hoover Dam
Percent of years in which Lake Mead dead pool-related reductions[7] 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

In **Figure ES-5**, 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 three categories of long-term future hydrology,[8] summarized in **Table ES-3**. Results are divided into these categories to demonstrate how the alternatives respond under different assumptions about long-term hydrologic conditions and to explore the impacts of hydrology on performance tradeoffs.

[7] 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.

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

Figure ES-5
Key Performance Tradeoffs in Different Hydrologic Conditions

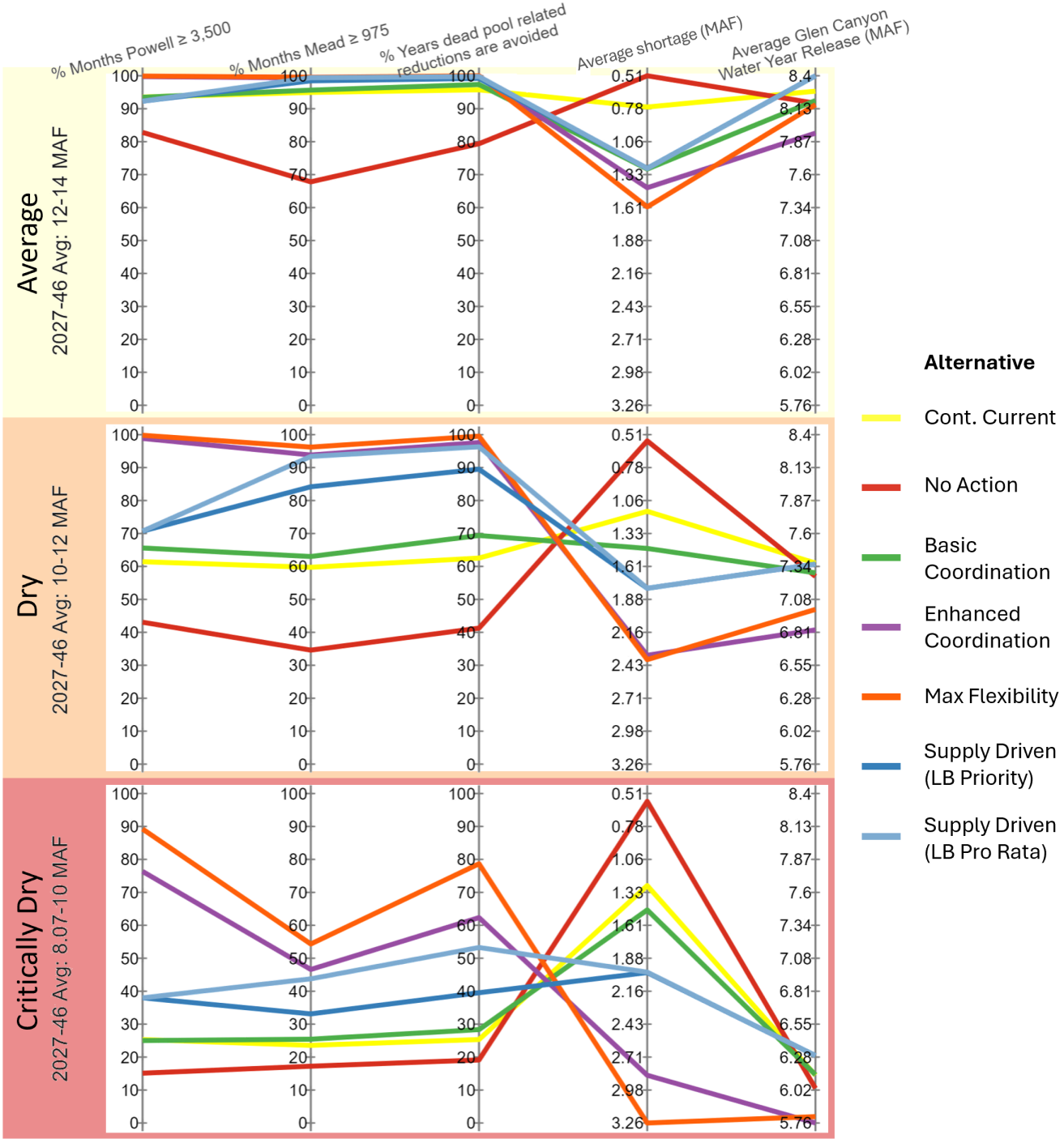


Table ES-3
Hydrologic Categories Included in Figure ES-5

Long-Term Hydrologic Category	Average Annual Simulated Lees Ferry Flow, 2027-2046 (maf)
Average[9]	12-14
Dry	10-12
Critically Dry	<10

A key performance tradeoff demonstrated by **Figure ES-5** is the tradeoff between percent of years 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 Average hydrologic category, this stands out as a difference between the No Action Alternative and the other alternatives, but in the Dry and Critically Dry hydrologic categories, 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, Supply Driven and Basic Coordination have lower volumes of shortage and lower reservoir protection, and No Action provides minimal protection and results in a high frequency of dead pool-related reductions while imposing minimal shortage. Differences in performance between Supply Driven (Lower Basin [LB] Priority approach) and the Supply Driven (LB Pro Rata approach) are primarily due to differing assumptions regarding the use of the storage and delivery mechanism for conserved water.

In Dry hydrologic futures, Maximum Operational Flexibility and Enhanced Coordination 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. In the Critically Dry hydrologic category, water year releases are low across all alternatives, but, for Basic Coordination and Supply Driven, this is driven largely by critically low Lake Powell elevations and thus constrained release volumes in over 60 percent of months.

The effectiveness of large shortages at preventing dead pool-related delivery reductions is clearest in the Critically Dry hydrologic category, where Maximum Operational Flexibility and Enhanced Coordination rely on large average shortages to significantly outperform the other alternatives in avoiding dead pool-related reductions. However, even these two more protective alternatives would experience Lake Mead elevations below 975 feet in over 50 percent of months if future conditions are similar to those in the Critically Dry hydrologic category.

[9] The 20-year average Lees Ferry natural flow is 12.7 maf in 2025. Since 2004, the 20-year running average has been in the Average hydrologic category in 21 out of 22 years, with one year slightly above 14 maf. Since 2018, the 20-year averages have been predominantly between 12 and 13 maf.

The analysis related to **Figure ES-5** examines tradeoffs and the influence of different long-term hydrologic scenarios on the alternatives' performance in important metrics. **Table ES-4** and **Table ES-5**, below, provide insight into what specific long-term 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.[10] Based on analysis of 1,200 modeled futures (which include system projections resulting from three sets of 2027 initial reservoir elevations), an average-flow threshold was identified for each alternative that skillfully predicted the occurrence of a critical system condition at least once within 20 years of implementation (between 2027 and 2046).

Table ES-4
Vulnerability to Lake Powell Falling Below Elevation 3,500 Feet at Least Once in the First 20 Years and Comparison to Historical Conditions

Alternative	Water Year 2027-2046 Average Natural Flow that Could Cause Vulnerability (maf/yr)	Number of Years Below Threshold 2000-2024 *(Historical Data)*	Number of Years Below Threshold 1906-2024 *(Historical Data)*
Cont. Current	≤13.1	8	12
No Action	≤18.6	25	100
Basic Coordination	≤13.1	8	12
Enhanced Coordination	≤9.7	0	0
Max Flexibility	≤9.0	0	0
Supply Driven (LB Priority)	≤13.9	18	40
Supply Driven (LB Pro Rata)	≤13.9	18	40

Table ES-5
Vulnerability to Lake Mead Falling Below Elevation 975 Feet at Least Once in the First 20 Years and Comparison to Historical Conditions

Alternative	Water Year 2027-2046 Average Natural Flow that Could Cause Vulnerability (maf/yr)	Number of Years Below Threshold 2000-2024 *(Historical Data)*	Number of Years Below Threshold 1906-2024 *(Historical Data)*
Cont. Current	≤12.5	1	1
No Action	≤15.8	24	81
Basic Coordination	≤12.0	0	0
Enhanced Coordination	≤10.9	0	0
Max Flexibility	≤10.2	0	0
Supply Driven (LB Priority)	≤11.3	0	0
Supply Driven (LB Pro Rata)	≤10.5	0	0

[10] 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.

With respect to Lake Powell falling below elevation 3,500 feet at least once in the next 20 years, the Supply Driven Alternative is most vulnerable action alternative: under these operations, Lake Powell would likely fall to critical elevations if the 20-year average natural flow at Lees Ferry is 13.9 maf or lower. Hydrologic conditions this dry or drier occurred in 18 years since 2000. With respect to Lake Mead falling below elevation 975 feet at least once in the next 20 years, the flow thresholds indicating vulnerability are drier for all of the action alternatives than any observed historical conditions.

ES.4.2 Near-term Vulnerability

The guidelines adopted through the post-2026 process are likely to face an early test as they begin 2027 operations with low elevations at Lake Powell and Lake Mead. It is useful to understand what hydrology could cause the same critical system conditions examined above to occur under each alternative within the first five years of operations. **Table ES-6** and **Table ES-7** compare the vulnerability thresholds between alternatives in the context of historical conditions. These results only include system projections resulting from the low 2027 initial reservoir elevations. For context, the 5-year average Lees Ferry natural flow is 11.1 maf in 2025.

With respect to Lake Powell falling below elevation 3,500 feet at least once in the next five years, the Supply Driven and Basic Coordination alternatives are equally vulnerable: under these operations, Lake Powell would likely fall to critical elevations if the average natural flow at Lees Ferry from 2027 to 2031 is 11.3 maf or lower. Hydrologic conditions this dry or drier occurred in six years since 2000. With respect to Lake Mead falling below elevation 975 feet at least once in the next five years, the Basic Coordination Alternative is the most vulnerable; Lake Mead would likely fall to critical elevations if the average flow from 2027 to 2031 is 10.2 maf or drier. These conditions have occurred in one year since 2000.

Table ES-6
Vulnerability to Lake Powell Falling Below Elevation 3,500 Feet at Least Once in the First Five Years and Comparison to Historical Conditions

Alternative	Water Year 2027-2031 Average Natural Flow that Could Cause Vulnerability (maf/yr)	Number of Years Below Threshold 2000-2024 *(Historical Data)*	Number of Years Below Threshold 1906-2024 *(Historical Data)*
Cont. Current	≤10.9	4	5
No Action	≤12.9	13	29
Basic Coordination	≤11.3	6	7
Enhanced Coordination	≤8.6	0	0
Max Flexibility	≤8.2	0	0
Supply Driven (LB Priority)	≤11.3	6	7
Supply Driven (LB Pro Rata)	≤11.3	6	7

Table ES-7
Vulnerability to Lake Mead Falling Below Elevation 975 Feet at Least Once in the First Five Years and Comparison to Historical Conditions

Alternative	Water Year 2027-2031 Average Natural Flow that Could Cause Vulnerability (maf/yr)	Number of Years Below Threshold 2000-2024 *(Historical Data)*	Number of Years Below Threshold 1906-2024 *(Historical Data)*
Cont. Current Strategies	≤10.9	3	5
No Action	≤12.5	11	25
Basic Coordination	≤10.2	1	1
Enhanced Coordination	≤9.2	0	0
Max Flexibility	≤9.1	0	0
Supply Driven (LB Priority)	≤10.0	1	1
Supply Driven (LB Pro Rata)	≤8.7	0	0

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 Draft EIS analyzes a broad range of reasonable 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 three years. Despite this extensive engagement, this Draft EIS does not identify a Preferred Alternative due to the current absence of a consensus-based approach to post-2026 reservoir operations among Basin entities. Reclamation anticipates identifying a Preferred Alternative after publication of this Draft EIS that incorporates elements or variations of the Draft EIS alternatives, which would then be fully analyzed in the Final EIS.

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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.

ES.5 Summary of Potential Effects

Table ES-8
Summary of Potential Effects of the Alternatives

Hydrology

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)
Reservoir Elevations	Lake Powell end-of-water-year (EOWY) elevations in the critically dry flow category	**Lowest** elevations in the critcally dry flow category	**Second lowest** elevations in the critcally dry flow category	**Highest** elevations in the critcally dry flow category	**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
	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.	**20%** of modeled futures meet *the preferred minimum performance*.	**25%** of modeled futures meet *the preferred minimum performance*.	**82%** of modeled futures meet *the preferred minimum performance*.	**87%** of modeled futures meet *the preferred minimum performance*.	**24%** of modeled futures meet *the preferred minimum performance*.	**24%** of modeled futures meet *the preferred minimum performance*.
	Lake Mead end-of-calendar-year (EOCY) elevations in all flow categories	**Lowest** elevations in all flow categories	**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
	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.	**25%** of modeled futures meet *the preferred minimum performance*.	**58%** of modeled futures meet *the preferred minimum performance*.	**75%** of modeled futures meet *the preferred minimum performance*.	**79%** of modeled futures meet *the preferred minimum performance*.	**71%** of modeled futures meet *the preferred minimum performance*.	**80%** of modeled futures meet *the preferred minimum performance*.
	Lake Mohave and Lake Havasu end of year elevations.	No impact; the existing rule curves continue to determine elevations.					
System Storage	Lake Powell + Lake Mead combined storage capacity (median values across all flow categories)	**Lowest** combined storage in all flow categories	**Second lowest** combined storage in all flow categories	**Second highest** combined storage in all flow categories	**Highest** combined storage in all flow categories	**Third lowest** combined storage in all flow categories	**Third highest** combined storage in all flow categories
	CRSP Reservoir (Flaming Gorge, Navajo, Blue Mesa, and Powell) combined storage capacity (median values across all flow categories)	**Highest** combined storage in the two wettest flow categories. **Third highest** combined storage in the average and two driest flow categories.	**Second lowest** combined storage in all flow categories except the dry and critically dry flow categories, where it is the **lowest**.	**Third highest** storage in the two wettest flow categories **Highest** combined storage in the average and two driest flow categories.	**Second highest** combined storage in all flow categories	**Lowest** combined storage in wet, moderately wet, and average flow categories (same as Supply Driven Alternative [LB Pro Rata approach])	**Lowest** combined storage in wet, moderately wet, average, and critically dry flow categories (same as Supply Driven Alternative [LB Priority approach])

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)
System Storage *(continued)*	Seven-Reservoir (Flaming Gorge, Navajo, Blue Mesa, Powell, Mead, Mohave, and Havasu) combined storage capacity (median values across all flow categories)	**Lowest** combined storage in all flow categories	**Second lowest** combined storage in all flow categories	**Second highest** combined storage in all flow categories	**Highest** combined storage in all flow categories	**Third lowest** combined storage in all flow categories	**Third highest** 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 6.26 maf the critically dry flow category.	Releases of 8.23 maf in the average flow category. Releases of 6.82 maf in the critically dry flow category.	Releases of 7.87 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 5.68 maf in the critically dry flow category.	Releases of 8.39 maf in the average flow category. Releases of 5.96 maf in the critically dry flow category.	Releases of 8.39 maf in the average flow category. Releases of 5.96 maf in the critically dry flow category.
	10-year Glen Canyon Dam releases under average and critically dry hydrology conditions (median values)	Releases of 82.2 maf in the average flow category. Releases of 74.5 maf Releases in the critically dry flow category.	Releases of 81.5 maf in the average flow category. Releases of 74.7 maf in the critically dry flow category.	Releases of 79.8 maf in the average flow category. Releases of 69.0 maf in the critically dry flow category.	Releases of 80.9 maf in the average flow category. Releases of 70.8 maf in the critically dry flow category.	Releases of 83.0 maf in the average flow category. Releases of 73.4 maf in the critically dry flow category.	Releases of 83.0 maf in the average flow category. Releases of 73.4 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 83.6 maf in the average flow category. Flows of 76.0 maf in the critically dry flow category.	Flows of 83.0 maf in the average flow category. Flows of 76.2 maf in the critically dry flow category.	Flows of 81.3 maf in the average flow category. Flows of 70.4 maf in the critically dry flow category.	Flows of 82.3 maf in the average flow category. Flows of 72.4 maf in the critically dry flow category.	Flows of 84.6 maf in the average flow category. Flows of 74.9 maf in the critically dry flow category.	Flows of 84.6 maf in the average flow category. Flows of 74.9 maf in the critically dry flow category.
	Annual EOCY Hoover Dam releases under critically dry hydrology conditions (median values)	Releases of 8.7 maf in the average flow category. Flows of 7.1 maf in the critically dry flow category.	Releases of 8.1 maf in the average flow category. Flows of 7.7 maf in the critically dry flow category.	Releases of 7.7 maf in the average flow category. Flows of 6.6 maf in the critically dry flow category.	Releases of 7.8 maf in the average flow category. Flows of 6.6 maf in the critically dry flow category.	Releases of 7.8 maf in the average flow category. Flows of 7.3 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.
	Annual EOCY Davis Dam releases under average and critically dry hydrology conditions (median values)	Releases of 8.6 maf in the average flow category. Releases of 7.0 maf in the critically dry flow category.	Releases of 8.0 maf in the average flow category. Releases of 7.6 maf in the critically dry flow category.	Releases of 7.5 maf in the average flow category. Releases of 6.5 maf in the critically dry flow category.	Releases of 7.7 maf in the average flow category. Releases of 6.5 maf in the critically dry flow category.	Releases of 7.7 maf in the average flow category. Releases of 7.2 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.
	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 5.9 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 4.7 maf in the critically dry flow category.	Releases of 6.3 maf in the average flow category. Releases of 5.8 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 5.5 maf in the critically dry flow category.

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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)**
River Flows	River flows in Reach 1 (Glen Canyon Dam to Lake Mead).	**Second highest** river flows in the critically dry flow category. Mirrors trends for releases from Glen Canyon Dam. River flows decrease as flow categories get drier.	**Highest** river flows in the critically dry flow category. Mirrors trends for releases from Glen Canyon Dam. River flows decrease as flow categories get drier.	**Lowest** river flows in the critically dry flow category. Mirrors trends for releases from Glen Canyon Dam. River flows decrease as flow categories get drier.	**Second lowest** river flows in the critically dry flow category. Mirrors trends for releases from Glen Canyon Dam. River flows decrease as flow categories get drier.	**Third lowest** river flows in the critically dry flow category (same as Supply Driven Alternative [LB Pro Rata approach]) Mirrors trends for releases from Glen Canyon Dam. River flows decrease as flow categories get drier.	**Third lowest** river flows in the critically dry flow category (same as Supply Driven Alternative [LB Priority approach]) Mirrors trends for releases from Glen Canyon Dam. River flows decrease as flow categories get drier.
	River flows in Reach 2 (Hoover Dam to Lake Mohave)	**Second lowest** river flows in the critically dry flow category. Mirrors trends for releases from Hoover Dam. River flows decrease as flow categories get drier.	**Highest** river flows in the dry flow category. Mirrors trends for releases from Hoover Dam. River flows decrease as flow categories get drier.	**Tied lowest** river flows in the dry flow category (same as Maximum Flexibility). Mirrors trends for releases from Hoover Dam. River flows decrease as flow categories get drier.	**Tied lowest** river flows in the dry flow category (same as Enhanced Coordination). Mirrors trends for releases from Hoover Dam. River flows decrease as flow categories get drier.	**Second highest** river flows in the dry flow category. Mirrors trends for releases from Hoover Dam. River flows decrease as flow categories get drier.	**Third highest** river flows in the dry flow category. Mirrors trends for releases from Hoover Dam. River flows decrease as flow categories get drier.
	River flows in Reach 3 (Davis Dam to Lake Havasu)	**Second lowest** river flows in the dry flow category. Mirrors trends for releases from Davis Dam. River flows decrease as flow categories get drier.	**Highest** river flows in the dry flow category. Mirrors trends for releases from Davis Dam. River flows decrease as flow categories get drier.	**Tied lowest** river flows in the dry flow category (same as Maximum Flexibility). Mirrors trends for releases from Davis Dam. River flows decrease as flow categories get drier.	**Tied lowest** river flows in the dry flow category (same as Enhanced Coordination). Mirrors trends for releases from Davis Dam. River flows decrease as flow categories get drier.	**Second highest** river flows in the dry flow category. Mirrors trends for releases from Davis Dam. River flows decrease as flow categories get drier.	**Third highest** river flows in the dry flow category. Mirrors trends for releases from Davis Dam. River flows decrease as flow categories get drier.
	River flows in Reach 4 (Parker Dam to Cibola Gage)	**Third highest** river flows in the dry flow category. Mirrors trends for releases from Parker Dam. River flows decrease as flow categories get drier.	**Highest** river flows in the dry flow category. Mirrors trends for releases from Parker Dam. River flows decrease as flow categories get drier.	**Lowest** river flows in the dry flow category. Mirrors trends for releases from Parker Dam. River flows decrease as flow categories get drier.	**Third lowest** river flows in the dry flow category. Mirrors trends for releases from Parker Dam. River flows decrease as flow categories get drier.	**Second highest** river flows in the dry flow category. Mirrors trends for releases from Parker Dam. River flows decrease as flow categories get drier.	**Second lowest** river flows in the dry flow category. Mirrors trends for releases from Parker Dam. River flows decrease as flow categories get drier.
	River flows in Reach 5 (Cibola Gage to Imperial Dam)	**Third highest** river flows in the dry flow category. Mirrors trends for river flows in Reach 4. River flows decrease as flow categories get drier.	**Highest** river flows in the dry flow category. Mirrors trends for river flows in Reach 4. River flows decrease as flow categories get drier.	**Lowest** river flows in the dry flow category. Mirrors trends for river flows in Reach 4. River flows decrease as flow categories get drier.	**Third lowest** river flows in the dry flow category. Mirrors trends for river flows in Reach 4. River flows decrease as flow categories get drier.	**Second highest** river flows in the dry flow category. Mirrors trends for river flows in Reach 4. River flows decrease as flow categories get drier.	**Second lowest** river flows in the dry flow category. Mirrors trends for river flows in Reach 4. River flows decrease as flow categories get drier.

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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)
River Flows *(continued)*	River flows in Reach 6 (Imperial Dam to Northerly International Boundary [NIB])	Among the **middle** performing. Releases of 1.1 maf in the middle flow category.	Among the **middle** performing Releases of 1.0 maf in the middle flow category.	Among the **middle** performing Releases of 1.0 maf in the middle flow category.	**Lowest** river flows in all flow categories. Releases of 0.9 maf in the middle flow category.	Among the **middle** performing**.** Releases of 1.0 maf in the middle flow category.	**Highest** river flows in all flow categories. Releases of 1.1 maf in the middle flow category.
	River flows in Reach 7 (NIB to SIB)	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. 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.
Groundwater	Groundwater in Reach 1 (Glen Canyon Dam to Lake Mead).	**Least** robust at keeping elevations 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.	**Second least** robust at keeping elevations 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.	**Second most** robust at keeping elevations 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.	**Most** robust at keeping elevations 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 third least** robust at keeping elevations 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 third least** robust at keeping elevations 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.	Groundwater elevations through this reach are not anticipated to be affected.	Groundwater elevations through this reach are not anticipated to be affected.	Groundwater elevations through this reach are not anticipated to be affected.	Groundwater elevations through this reach are not anticipated to be affected.	Groundwater elevations through this reach are not anticipated to be affected.
	Groundwater in Reach 3 (Davis Dam to Lake Havasu)	**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.	**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.	**Tied 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 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.	**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.	**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.

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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)
Groundwater *(continued)*	Groundwater in Reach 4 (Parker Dam to Cibola Gage)	**Third highest** river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Highest** river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Lowest** river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Third lowest** river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Second highest** river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Second lowest** 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)	**Third highest** river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Highest** river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Lowest** river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Third lowest** river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Second highest** river flows in reach; changes to groundwater levels adjacent to the river may be affected by changes in river stage.	**Second lowest** 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.	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.	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.	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.	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.	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.	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.	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.

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Water Deliveries

Impact Category	Performance Indicator	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)**
Apportionments	Upper Division States	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 pro rata.	Shortages are distributed based on priority.	Shortages are distributed based on priority.	Shortages are distributed pro rata.
Lower Division States Water Supply Determinations and Total Water Deliveries	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.	**30%** of modeled futures meet *the preferred minimum performance*.	**62%** of modeled futures meet *the preferred minimum performance*.	**84%** of modeled futures meet *the preferred minimum performance*.	**91%** of modeled futures meet *the preferred minimum performance*.	**76%** of modeled futures meet *the preferred minimum performance*.	**85%** of modeled futures meet *the preferred minimum performance*.
	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.[11]	Median reductions remain **similar** with conservation on or off.[1]	Median reductions **slightly higher with conservation on** compared to conservation off in **wetter flow** categories. Median reductions **slightly higher with conservation off** compared to conservation on in **drier flow categories**.	Median reductions **slightly higher with conservation on** compared to conservation off in **wetter flow** categories. Median reductions **slightly higher with** conservation **off** compared to conservation on in **drier flow categories**.	Median reductions **slightly higher with conservation on** compared to conservation off	Median reductions **slightly higher with conservation on** compared to conservation off
	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 Arizona: 0.47 California: 0.00 Nevada: 0.03	Total Lower Basin: 1.48 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
	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: 1.7 maf **Highest**	Median reductions increase as flow categories become drier. Shortage: 1.48 maf **Second lowest** Dead pool-related reductions: 0 maf **Tied lowest**	Median reductions increase as flow categories become drier. Shortage: 2.93 maf **Second highest** Dead pool-related reductions: 0 maf **Tied lowest**	Median reductions increase as flow categories become drier. Shortage: 2.98 maf **Highest** Dead pool-related reductions: 0 maf **Tied lowest**	Median reductions increase as flow categories become drier. Shortage: 1.95 maf **Third highest** Dead pool-related reductions: 0 maf **Tied lowest**	Median reductions increase as flow categories become drier. Shortage: 1.94 maf **Third lowest** Dead pool-related reductions: 0 maf **Tied lowest**

[11] 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.

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Impact Category	Performance Indicator	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)
Lower Division States Water Supply Determinations and Total Water Deliveries *(continued)*	Annual shortage by state under critically dry hydrology conditions (median values). Values are reported as percent of apportionment.	Arizona: 16.7% **Lowest** California: 0% **Lowest** Nevada: 11% **Lowest**	Arizona: 41.1% **Second highest** California: 0% **Lowest** Nevada: 27.2% **Third highest**	Arizona: 32.6% **Third lowest** California: 32.6% **Highest** Nevada: 32.6% **Second highest**	Arizona: 57.8% **Highest** California: 16.4% **Second highest** Nevada: 45.9% **Highest**	Arizona: 39.7% **Third highest** California: 10% **Second lowest** Nevada: 25.5% **Third lowest**	Arizona: 31.4% **Second lowest** California: 15.3% **Third lowest** Nevada: 21.5% **Second lowest**
	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: 54.6% **Second Lowest** California: 89.0% **Second highest** Nevada: 64.2% **Lowest**	Arizona: 58.9% **Third highest** California: 100% **Highest** Nevada: 83.3% **Third Lowest**	Arizona: 71.3% **Highest** California: 66.6% **Lowest** Nevada: 89.2% **Third highest**	Arizona: 42.5% **Lowest** California: 82.0% **Second Lowest** Nevada: 72.1% **Second Lowest**	Arizona: 57.4% **Third Lowest** California 87.0% **Third highest** Nevada: 89.7% **Second highest**	Arizona: 63.0% **Second highest** California: 84.0% **Third Lowest** Nevada: 96.4% **Highest**
Deliveries to Mexico	Annual delivery reduction under critically dry hydrology (median values). Values are reported as percent of allotment.	6.7% **Lowest**	16.4% **Second Lowest**	32.6% **Second highest**	33.1% **Highest**	21.7% **Third highest**	21.5% **Third Lowest**
	Annual depletions under critically dry hydrology (median values). Values are reported as percent of allotment.	75.0% **Third Lowest**	83.6% **Highest**	68.1% **Second Lowest**	66.1% **Lowest**	83.3% **Second highest**	83.3% **Second highest**
Lower Division States Combined Shortages	Shortage Allocation Model (SAM) and Alternative Distribution Model (ADM) estimated shortage impacts by water user type (Tribal, Domestic, and Non-Tribal Irrigation) under shortage conditions over a specified range of shortage volumes	Tribal: 241 kaf Domestic: 277 kaf Non-Tribal Irrigation: 6 kaf	Tribal: 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

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Geomorphology and Sediment

Impact Category	Performance Indicator	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)
Water Availability	Percent of modeled futures in which *Lake Powell exceeds 3,500 feet in November or April (or both) in 100 percent of years*.	**25%** of modeled futures meet *the preferred minimum performance*.	**37%** of modeled futures meet *the preferred minimum performance*.	**87%** of modeled futures meet *the preferred minimum performance*.	**91%** of modeled futures meet *the preferred minimum performance*.	**30%** 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 900,000 acre-feet (approximately 15,000 cfs) in at least 90 percent of months*. In other words, Glen Canyon Dam release rates are non-erosive in at least 90 percent of the simulation period.	**10%** of modeled futures meet *the preferred minimum performance*.	**28%** of modeled futures meet *the preferred minimum performance*.	**59%** of modeled futures meet *the preferred minimum performance*.	**20%** of modeled futures meet *the preferred minimum performance*.	**8%** 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 HFE, in November or April at least once every four years*.	**43%** of modeled futures meet *the preferred minimum performance*.	**47%** 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*.	**43%** of modeled futures meet *the preferred minimum performance*.	
High Flow Experiment (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*.	**10%** of modeled futures meet *the preferred minimum performance*.	**20%** of modeled futures meet *the preferred minimum performance*.	**23%** of modeled futures meet *the preferred minimum performance*.	**25%** of modeled futures meet *the preferred minimum performance*.	**17%** 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 percent of the years.	**82%** of modeled futures meet *the preferred minimum performance*.	**90%** of modeled futures meet *the preferred minimum performance*.	**92%** 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*.	
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 percent of the sand transport)*.	**49%** of modeled futures meet *the preferred minimum performance*.	**74%** 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*.	**77%** of modeled futures meet *the preferred minimum performance*.	

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Water Quality

Impact Category	Performance Indicator	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)
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 mg/L in 100% of years*.	**77%** of modeled futures meet *the preferred minimum performance*.	**83%** of modeled futures meet *the preferred minimum performance*.	**80%** of modeled futures meet *the preferred minimum performance*.	**86%** of modeled futures meet *the preferred minimum performance*.	**91%** 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*.	**77%** of modeled futures meet *the preferred minimum performance*.	**85%** 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*.	**92%** of modeled futures meet *the preferred minimum performance*.	**93%** 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*.	**88%** of modeled futures meet *the preferred minimum performance*.	**93%** of modeled futures meet *the preferred minimum performance*.	**94%** of modeled futures meet *the preferred minimum performance*.	**96%** of modeled futures meet *the preferred minimum performance*.	**98%** 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 hydrology conditions (median values)	13.6 °C (56.5 °F)	13.8 °C (56.8 °F)	12.3 °C (54.1 °F)	13.2 °C (55.8 °F)	13.6 °C (56.5 °F)	13.6 °C (56.5 °F)
How would reservoir storage, reservoir releases, and corresponding changes in river flows downstream of the reservoirs affect projected **temperature**?	Annual maximum daily temperature of the Colorado River **at Lees Ferry** under critically dry hydrology conditions (median values)	19.5 °C (67.1 °F)	19.7 °C (67.5 °F)	16.3 °C (61.3 °F)	17.7 °C (63.9 °F)	18.9 °C (66 °F)	18.9 °C (66 °F)
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 Pearce Ferry** under critically dry hydrology conditions (median values)	16.8 °C (62.2 °F)	16.7 °C (62 °F)	16.1 °C (61 °F)	16.6 °C (61.9 °F)	16.8 °C (62.2 °F)	16.8 °C (62.2 °F)
How would reservoir storage, reservoir releases, and corresponding changes in river flows downstream of the reservoirs affect projected **temperature**?	Annual maximum daily temperature of the Colorado River **at Pearce Ferry** under critically dry hydrology conditions (median values)	23.3 °C (73.9 °F)	23.5 °C (74.3 °F)	22.4 °C (72.3 °F)	23.3 °C (73.9 °F)	23.6 °C (74.5 °F)	23.6 °C (74.5 °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*.	**40%** of modeled futures meet *the preferred minimum performance*.	**40%** of modeled futures meet *the preferred minimum performance*.	**89%** of modeled futures meet *the preferred minimum performance*.	**87%** 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*.

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Impact Category	Performance Indicator	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)
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 hydrology conditions (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.	
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 hydrology conditions (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 for any alternative to significantly reduce the dilution capacity.	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 for any alternative to significantly reduce the dilution capacity.	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 for any alternative to significantly reduce the dilution capacity.	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 for any alternative to significantly reduce the dilution capacity.	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 for any alternative to significantly reduce the dilution capacity.	

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Air Quality

Impact Category	Performance Indicator	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)
Shoreline Area	Percent of modeled futures in which ***Lake Mead*** *shoreline exposure area stays below 500 square kilometers in every month.*	**40%** of modeled futures meet *the preferred minimum performance.*	**67%** 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.*	**79%** of modeled futures meet *the preferred minimum performance.*	
	Percent of modeled futures in which ***Lake Powell*** *shoreline exposure area stays below 500 square kilometers in every month.*	**24%** of modeled futures meet *the preferred minimum performance.*	**33%** of modeled futures meet *the preferred minimum performance.*	**86%** of modeled futures meet *the preferred minimum performance.*	**95%** of modeled futures meet *the preferred minimum performance.*	**28%** of modeled futures meet *the preferred minimum performance.*	
Shoreline Dust Emissions	Percent of modeled futures in which ***Lake Mead*** *shoreline dust emissions stay below 500 kilograms in every month.*	**27%** of modeled futures meet *the preferred minimum performance.*	**59%** of modeled futures meet *the preferred minimum performance.*	**78%** of modeled futures meet *the preferred minimum performance.*	**82%** of modeled futures meet *the preferred minimum performance.*	**74%** of modeled futures meet *the preferred minimum performance.*	
	Percent of modeled futures in which ***Lake Powell*** *shoreline dust emissions stay below 450 kilograms in every month.*	**22%** of modeled futures meet *the preferred minimum performance.*	**29%** of modeled futures meet *the preferred minimum performance.*	**85%** of modeled futures meet *the preferred minimum performance.*	**92%** of modeled futures meet *the preferred minimum performance.*	**27%** of modeled futures meet *the preferred minimum performance.*	
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 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 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.	
	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 slightly less affected than under the No Action 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 slightly less affected than under the Basic Coordination Alternative, resulting in the **third 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.	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.	

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Impact Category	Performance Indicator	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)
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 **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.	
	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 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.	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.	

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Aquatic Resources

Impact Category	Performance Indicator	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)
Lake Powell elevations	Percent of modeled futures in which *Lake Powell elevation is below 3,598 feet at least 60% of months*, meaning critical habitat of Colorado Pikeminnow and Razorback Sucker is not inundated in the Colorado River Inflow.	**43%** of modeled futures meet *the preferred minimum performance*.	**49%** of modeled futures meet *the preferred minimum performance*.	**17%** of modeled futures meet *the preferred minimum performance*.	**20%** 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*.
	Percent of modeled futures in which *Lake Powell elevation is below 3,600 feet at least 60% of months*, meaning critical habitat of Colorado Pikeminnow and Razorback Sucker is not inundated in the San Juan River Inflow.	**44%** of modeled futures meet *the preferred minimum performance*.	**50%** of modeled futures meet *the preferred minimum performance*.	**18%** of modeled futures meet *the preferred minimum performance*.	**21%** of modeled futures meet *the preferred minimum performance*.	**59%** of modeled futures meet *the preferred minimum performance*.	**59%** 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*.	**29%** of modeled futures meet *the preferred minimum performance*.	**29%** of modeled futures meet *the preferred minimum performance*.	**18%** of modeled futures meet *the preferred minimum performance*.	**17%** 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*.
	Percent of modeled futures in which *October 1st Lake Powell elevation is above 3,570 feet at least 80% of years*, meaning the risk of smallmouth bass entrainment is reduced.	**34%** of modeled futures meet *the preferred minimum performance*.	**30%** of modeled futures meet *the preferred minimum performance*.	**73%** of modeled futures meet *the preferred minimum performance*.	**61%** of modeled futures meet *the preferred minimum performance*.	**28%** of modeled futures meet *the preferred minimum performance*.	**28%** of modeled futures meet *the preferred minimum performance*.
Water Temperature	Percent of modeled futures in which *water temperature at Lees Ferry (river mile [RM] 0) never exceeds 20°C*.	**22%** of modeled futures meet *the preferred minimum performance*.	**24%** of modeled futures meet *the preferred minimum performance*.	**71%** of modeled futures meet *the preferred minimum performance*.	**59%** of modeled futures meet *the preferred minimum performance*.	**21%** of modeled futures meet *the preferred minimum performance*.	**21%** 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 ≥200 days every year*.	**1%** of modeled futures meet *the preferred minimum performance*.	**1%** of modeled futures meet *the preferred minimum performance*.	**0%** of modeled futures meet *the preferred minimum performance*.	**1%** 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 in which *water temperature at the Little Colorado River Confluence (RM 62) exceeds 16°C ≤170 days every year*.	**35%** of modeled futures meet *the preferred minimum performance*.	**34%** of modeled futures meet *the preferred minimum performance*.	**78%** of modeled futures meet *the preferred minimum performance*.	**70%** 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*.
	Percent of modeled futures in which *water temperature at the Havasu Creek Confluence (RM 157.2) exceeds 12°C ≥200 days every year*.	**21%** of modeled futures meet *the preferred minimum performance*.	**20%** of modeled futures meet *the preferred minimum performance*.	**9%** of modeled futures meet *the preferred minimum performance*.	**8%** 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*.

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Impact Category	Performance Indicator	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)**
Water Temperature *(continued)*	Percent of modeled futures in which *water temperature at the Havasu Creek Confluence (RM 157.2) exceeds 16°C ≤190 days every year.*	**35%** of modeled futures meet *the preferred minimum performance.*	**42%** 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.*	**35%** of modeled futures meet *the preferred minimum performance.*	**35%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which *water temperature at Pearce Ferry (RM 281) exceeds 12°C ≥200 days every year.*	**63%** of modeled futures meet *the preferred minimum performance.*	**70%** of modeled futures meet *the preferred minimum performance.*	**67%** of modeled futures meet *the preferred minimum performance.*	**63%** of modeled futures meet *the preferred minimum performance.*	**78%** of modeled futures meet *the preferred minimum performance.*	**78%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which *water temperature at Pearce Ferry (RM 281) exceeds 16°C ≤190 days every year.*	**19%** of modeled futures meet *the preferred minimum performance.*	**19%** of modeled futures meet *the preferred minimum performance.*	**49%** of modeled futures meet *the preferred minimum performance.*	**40%** 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.*
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.*	**22%** of modeled futures meet *the preferred minimum performance.*	**25%** of modeled futures meet *the preferred minimum performance.*	**69%** of modeled futures meet *the preferred minimum performance.*	**57%** of modeled futures meet *the preferred minimum performance.*	**23%** of modeled futures meet *the preferred minimum performance.*	**23%** of modeled futures meet *the preferred minimum performance.*
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.*	**18%** of modeled futures meet *the preferred minimum performance.*	**18%** of modeled futures meet *the preferred minimum performance.*	**61%** of modeled futures meet *the preferred minimum performance.*	**50%** 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.*
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.*	**13%** of modeled futures meet *the preferred minimum performance.*	**44%** of modeled futures meet *the preferred minimum performance.*	**57%** of modeled futures meet *the preferred minimum performance.*	**56%** of modeled futures meet *the preferred minimum performance.*	**58%** of modeled futures meet *the preferred minimum performance.*	**69%** 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.*	**58%** of modeled futures meet *the preferred minimum performance.*	**26%** of modeled futures meet *the preferred minimum performance.*	**12%** of modeled futures meet *the preferred minimum performance.*	**13%** of modeled futures meet *the preferred minimum performance.*	**9%** of modeled futures meet *the preferred minimum performance.*	**7%** 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 2008–2024 in 100% of the time.*	**66%** of modeled futures meet *the preferred minimum performance.*	**58%** of modeled futures meet *the preferred minimum performance.*	**32%** of modeled futures meet *the preferred minimum performance.*	**20%** of modeled futures meet *the preferred minimum performance.*	**34%** of modeled futures meet *the preferred minimum performance.*	**32%** of modeled futures meet *the preferred minimum performance.*

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Vegetation Including Special Status Species

Impact Category	Performance Indicator	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)
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 best performing** alternatives for the Lake Mead and Hoover Dam to SIB reaches because it has annual variability similar to historic conditions. The Basic Coordination Alternative is **among the least performing** alternatives for the Lake Powell reach because its annual variability is least like historic conditions.	The Enhanced Coordination 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 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 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 and Lake Mead reaches 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 the 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 and Hoover Dam to SIB reach because its annual variability is least like historic conditions.	
	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 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 best performing** alternatives for the Lake Mead and Hoover Dam to SIB reaches because it has annual variability similar to historic conditions. The Basic Coordination Alternative is **among the least performing** alternatives for the Lake Powell reach because its annual variability is least like 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 best performing** alternatives for the Lake Powell and Lake Mead reaches 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 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 the Lake Powell and Hoover Dam to SIB reach because its annual variability is least like historic conditions. No Alternative is better performing in the Glen Canyon Dam to Lake Mead reach.	
	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).					

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Impact Category	Performance Indicator	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)**
Vegetation, including special status plant species *(continued)*	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.	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.	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.	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. However, under the Maximum Flexibility Alternative under the driest modeled conditions, marsh habitat **could increase** compared to 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. However, under the Supply Driven Alternative under the driest modeled conditions, marsh habitat **could increase** 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. However, under the No Action Alternative under the driest modeled conditions, woody riparian vegetation **could increase** compared to 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.	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.	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.	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.	
	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, no alternative is better performing compared to the modeled historic conditions in the Glen Canyon Dam to Lake Mead reach.					
	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. However, under the No Action Alternative under the driest modeled conditions, the No Action Alternative had the **highest** proportion of modeled native cover compared to 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.	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.	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. However, under the Maximum Operational Flexibility Alternative under the driest modeled conditions, the Maximum Operational Flexibility Alternative had the **lowest** proportion of modeled native cover compared to 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.	

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	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)
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.	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.	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.	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. However, under the Maximum Operational Flexibility Alternative under the driest modeled conditions, annual total vegetation cover **could increase** compared to 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. However, under the Supply Driven Alternative under the driest modeled conditions, annual total vegetation cover **could increase** compared to modeled historic conditions.	

Terrestrial Wildlife Including Special Status Species

Impact Category	Performance Indicator	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)
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 best performing** alternatives for the Lake Mead and Hoover Dam to SIB reaches because it has annual variability similar to historic conditions. The Basic Coordination 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 Enhanced Coordination 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 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 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 and Lake Mead reaches 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. However, under the Maximum Flexibility Alternative under the driest modeled conditions, marsh habitat could increase compared to modeled 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 the 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 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. However, under the Supply Driven Alternative under the driest modeled conditions, marsh habitat could increase compared to modeled historic conditions.	

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	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)
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 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. However, under the No Action Alternative under the driest modeled conditions, woody riparian vegetation may increase compared to modeled historic conditions	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 Basic Coordination 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 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 best performing** alternatives for the Lake Powell and Lake Mead reaches 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 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 the Lake Powell 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.	
	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).	Upland habitat would be gained or lost depending on whether conditions are suitable for marsh or woody riparian habitat (see above).	Upland habitat would be gained or lost depending on whether conditions are suitable for marsh or woody riparian habitat (see above).	Upland habitat would be gained or lost depending on whether conditions are suitable for marsh or woody riparian habitat (see above).	Upland habitat would be gained or lost depending on whether conditions are suitable for marsh or woody riparian habitat (see above).	Upland habitat would be gained or lost depending on whether conditions are suitable for marsh or woody riparian habitat (see above).

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

Impact Category	Performance Indicator	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)**
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 wet hydrologic conditions, median water levels are at or above 3,680 feet protecting all sites up to 3,700 feet. Under average conditions, median water levels fall below 3,600 feet exposing at least 274 archaeological sites. Under critically dry conditions, median water levels drop below 3,500 feet, potentially leaving the most sites exposed with at least 274 sites down to 3,580 feet and those between 3,580 feet and 3,500 feet out of the 477 sites below 3,580 feet. Lake Mead: Under wet hydrologic conditions, median elevations are around 1,150 feet exposing at least 173 archaeological sites. During average hydrologic conditions, median elevations are around 990 feet potentially exposing all 240 sites. In critically dry conditions, all 240 sites would likely be exposed due to low reservoir elevations.	Lake Powell: Under wet hydrologic conditions, median water levels are at or above 3,680 feet, protecting at least 686 sites. Under average conditions, median water levels fall below 3,600 feet exposing at least 274 archaeological sites. Under critically dry conditions, median water levels drop below 3,500 feet, potentially leaving the most sites exposed with at least 274 sites down to 3,580 feet and those between 3,580 feet and 3,500 feet out of the 477 sites below 3,580 feet. Lake Mead: Under wet hydrologic conditions, median water levels are around 1,180 feet, exposing at least 119 archaeological sites. During average hydrological conditions, median elevations are around 1,080 feet exposing at least 237 sites. In critically dry conditions, all 240 sites would likely be exposed due to low reservoir elevations.	Lake Powell: Under wet hydrologic conditions, median water levels are at or above 3,680 feet protecting at least 686 sites. Under average conditions, median water levels drop to around 3,630 feet, leaving at more than 193 sites exposed. Under critically dry conditions, median water levels drop below 3,500 feet, potentially leaving the most sites exposed with at least 274 sites down to 3,580 feet and those between 3,580 feet and 3,500 feet out of the 477 sites below 3,580 feet. Lake Mead: Under wet hydrologic conditions, median water levels are around 1,210 feet, exposing the fewest number of sites (fewer than 69 sites). Under average conditions, median elevations are around 1,110 feet exposing at least 217 sites. In critically dry conditions, all 240 sites would likely be exposed due to low reservoir elevations.	Lake Powell: Under wet hydrologic conditions, median water levels are at or above 3,680 feet protecting at least 686 sites. Under average conditions, median water levels drop to around 3,620 feet, leaving at least 193 sites exposed. Under critically dry conditions, median water levels drop below 3,500 feet, potentially leaving the most sites exposed with at least 274 sites down to 3,580 feet and those between 3,580 feet and 3,500 feet out of the 477 sites below 3,580 feet. Lake Mead: Under wet conditions, median water levels are around 1,210 feet, exposing the fewest number of sites (fewer than 69). Under average conditions, median elevations are around 1,130 feet exposing at least 202 sites. Under critically dry conditions, all 240 sites would likely be exposed due to low reservoir elevations.	Lake Powell: During the wettest flow categories, median water levels are at or above 3,680 feet protecting at least 686 sites. Under average conditions, median elevations are below 3,580 feet leaving at least 274 sites exposed. Under critically dry conditions, median water levels drop below 3,500 feet, potentially leaving the most sites exposed with at least 274 sites down to 3,580 feet and those between 3,580 feet and 3,500 feet out of the 477 sites below 3,580 feet. Lake Mead: Under wet conditions, median water levels are around 1,220 feet, protecting all 240 sites. During average conditions, median elevations are around 1,160 feet exposing at least 173 sites. Under critically dry conditions, all 240 sites would likely be exposed due to low reservoir elevations.
	Lake Powell: Percent of modeled futures in which *the preservation risk at Lake Powell is below 2.72 in at least 90% of months* Lake Mead: Percent of modeled futures in which *the preservation risk at Lake Mead is below 2.24 in at least 90% of months*	Lake Powell: **23%** of modeled futures meet *the preferred minimum performance*. Lake Mead: **7%** of modeled futures meet *the preferred minimum performance*.	Lake Powell: **21%** of modeled futures meet *the preferred minimum performance*. Lake Mead: **22%** of modeled futures meet *the preferred minimum performance*.	Lake Powell: **58%** of modeled futures meet *the preferred minimum performance*. Lake Mead: **26%** of modeled futures meet *the preferred minimum performance*.	Lake Powell: **36%** of modeled futures meet *the preferred minimum performance*. Lake Mead: **37%** of modeled futures meet *the preferred minimum performance*.	Lake Powell: **16%** of modeled futures meet *the preferred minimum performance*. Lake Mead: **43%** of modeled futures meet *the preferred minimum performance*.	

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Impact Category	Performance Indicator	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)**
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 wet and 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 wet and 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 wet and 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 wet and 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 wet and 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 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*	**11%** of modeled futures meet *the preferred minimum performance.*	**5%** of modeled futures meet *the preferred minimum performance.*	**15%** of modeled futures meet *the preferred minimum performance.*	**15%** 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.*

Paleontological Resources

Impact Category	Performance Indicator	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)**
Paleontological preservation risk due to dam operations	Percent of modeled futures in which *monthly preservation risk rank at **Lake Powell** stays below 2.9 at least 90% of months*	**22%** of modeled futures meet *the preferred minimum performance.*	**18%** of modeled futures meet *the preferred minimum performance.*	**47%** of modeled futures meet *the preferred minimum performance.*	**28%** of modeled futures meet *the preferred minimum performance.*	**13%** of modeled futures meet *the preferred minimum performance.*	
	Percent of modeled futures in which *monthly preservation risk rank at **Lake Mead** stays below 2.3 at least 90% of months*	**6%** of modeled futures meet *the preferred minimum performance.*	**15%** of modeled futures meet *the preferred minimum performance.*	**18%** of modeled futures meet *the preferred minimum performance.*	**29%** of modeled futures meet *the preferred minimum performance.*	**35%** of modeled futures meet *the preferred minimum performance.*	
Paleontological resource preservation and stability due to altered sediment transport	Percent of modeled futures 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*	**11%** of modeled futures meet *the preferred minimum performance.*	**5%** of modeled futures meet *the preferred minimum performance.*	**15%** of modeled futures meet *the preferred minimum performance.*	**15%** of modeled futures meet *the preferred minimum performance.*	**2%** of modeled futures meet *the preferred minimum performance.*	
	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)*	**49%** of modeled futures meet *the preferred minimum performance.*	**74%** 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.*	**77%** of modeled futures meet *the preferred minimum performance.*	

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Impact Category	Performance Indicator	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)
Impacts of increased disturbance, unauthorized collection, and recreational impacts on paleontological resources due to dam operations and altered water levels	Percent of modeled futures in which *Lake Powell elevation stays above 3,500 feet in 100% of months*	**20%** of modeled futures meet *the preferred minimum performance.*	**25%** of modeled futures meet *the preferred minimum performance.*	**82%** of modeled futures meet *the preferred minimum performance.*	**87%** of modeled futures meet *the preferred minimum performance.*	**24%** of modeled futures meet *the preferred minimum performance.*	
	Percent of modeled futures in which *Lake Mead elevation stays above 975 feet in 100% of months*	**25%** of modeled futures meet *the preferred minimum performance.*	**58%** of modeled futures meet *the preferred minimum performance.*	**75%** of modeled futures meet *the preferred minimum performance.*	**79%** of modeled futures meet *the preferred minimum performance.*	**71%** of modeled futures meet *the preferred minimum performance.*	**80%** of modeled futures meet *the preferred minimum performance.*

Tribal Resources

Impact Category	Performance Indicator	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)
Reservoir Elevations that may expose TCPs, 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
	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
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 wet and 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 wet and 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 wet and 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 wet and 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 wet and 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.	

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Impact Category	Performance Indicator	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)
Projected changes in natural resources important to Native Americans including riparian vegetation and wildlife	Woody riparian habitat most similar to historic conditions	Among the **middle performing alternatives** for the Lake Powell reach, among the **best performing alternatives** for the Hoover Dam to SIB reaches, and among the **least performing alternatives** for the Lake Mead reach.	Among the **best performing alternatives** for the Lake Mead and Hoover Dam to SIB reaches and among **the least performing alternatives** for the Lake Powell reach.	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 **best performing alternatives** for the Lake Powell and Lake Mead reaches and 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. Among the **least performing alternatives** for the Lake Powell and Hoover Dam to SIB. The **best performing alternative** in the Glen Canyon Dam to Lake Mead reach.	
	Critical fish habitat (Colorado River)	Modeling presented for aquatic species suggests that **between 41 and 50%** of futures would meet acceptable critical habitat performance standards	Modeling suggests that **between 41 and 50%** of futures would meet acceptable critical habitat performance standards	Modeling suggests that **between 11 and 20%** of futures would meet acceptable critical habitat performance standards	Modeling suggests that **between 11 and 20%** of futures would meet acceptable critical habitat performance standards	Modeling suggests that **between 51 and 60%** of futures would meet acceptable critical habitat performance standards	

Recreation

Impact Category	Performance Indicator	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)
Reservoir elevation impacts on shoreline recreational facilities, reservoir boating, and sport fishing opportunities	Percent of modeled futures in which *the proportion of **Lake Powell** recreation sites open stays above 0.7 (historical benchmark) for all summer months (May 31 – August 31) each year*	**17%** of modeled futures meet *the preferred minimum performance.*	**15%** of modeled futures meet *the preferred minimum performance.*	**45%** of modeled futures meet *the preferred minimum performance.*	**26%** of modeled futures meet *the preferred minimum performance.*	**13%** of modeled futures meet *the preferred minimum performance.*	**13%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures 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*	**8%** of modeled futures meet *the preferred minimum performance.*	**35%** of modeled futures meet *the preferred minimum performance.*	**37%** of modeled futures meet *the preferred minimum performance.*	**42%** of modeled futures meet *the preferred minimum performance.*	**45%** of modeled futures meet *the preferred minimum performance.*	**53%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which ***Lake Powell** elevation is above the identified boating hazard minimum (3,620 ft) for at least 20% of months*	**66%** of modeled futures meet *the preferred minimum performance.*	**61%** of modeled futures meet *the preferred minimum performance.*	**84%** of modeled futures meet *the preferred minimum performance.*	**83%** of modeled futures meet *the preferred minimum performance.*	**48%** of modeled futures meet *the preferred minimum performance.*	**48%** of modeled futures meet *the preferred minimum performance.*
	Percent of modeled futures in which ***Lake Mead** elevation is above the identified boating hazard minimum (1,170 ft) for at least 10 percent of months*	**29%** of modeled futures meet *the preferred minimum performance.*	**39%** of modeled futures meet *the preferred minimum performance.*	**58%** of modeled futures meet *the preferred minimum performance.*	**68%** of modeled futures meet *the preferred minimum performance.*	**78%** of modeled futures meet *the preferred minimum performance.*	**81%** of modeled futures meet *the preferred minimum performance.*

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Impact Category	Performance Indicator	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)
Glen Canyon Dam releases impacts on whitewater boating and sport fishing	Percent of modeled futures in which *daytime flows (7am – 7pm) below Glen Canyon Dam are at least 5,000 cfs every day*	**78%** of modeled futures meet *the preferred minimum performance.*	**80%** of modeled futures meet *the preferred minimum performance.*	**98%** of modeled futures meet *the preferred minimum performance.*	**57%** 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.*
	Percent of modeled futures in *which daily water temperature at Lees Ferry never exceed 20℃*	**22%** of modeled futures meet *the preferred minimum performance.*	**24%** of modeled futures meet *the preferred minimum performance.*	**71%** of modeled futures meet *the preferred minimum performance.*	**59%** of modeled futures meet *the preferred minimum performance.*	**21%** of modeled futures meet *the preferred minimum performance.*	**21%** of modeled futures meet *the preferred minimum performance.*

Dams and Electrical Power Resources

Impact Category	Performance Indicator	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)
Reservoir Elevations and Power Pool Robustness	Percent of modeled futures in which *Lake Powell elevation is always above minimum power pool (3,490 feet).*	**24%** of modeled futures meet *the preferred minimum performance.*	**33%** of modeled futures meet *the preferred minimum performance.*	**86%** of modeled futures meet *the preferred minimum performance.*	**95%** of modeled futures meet *the preferred minimum performance.*	**28%** of modeled futures meet *the preferred minimum performance.*	**28%** 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).*	**30%** of modeled futures meet *the preferred minimum performance.*	**61%** of modeled futures meet *the preferred minimum performance.*	**81%** of modeled futures meet *the preferred minimum performance.*	**87%** of modeled futures meet *the preferred minimum performance.*	**76%** of modeled futures meet *the preferred minimum performance.*	**84%** 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: 635-750 MW Hoover Dam: 400-1,550 MW	Glen Canyon Dam: 625-790 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
	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
Energy Generation of the Glen Canyon Dam and Hoover Dam Powerplants	Water year generation (Megawatt Hours [MWh]) under average hydrology conditions	Glen Canyon Dam: 3-4 MWh Hoover Dam: 1.3-3.3 MWh	Glen Canyon Dam: 3.1-3.7 MWh Hoover Dam: 2.8-3.6 MWh	Glen Canyon Dam: 3-4.1 MWh Hoover Dam: 2.7-3.8 MWh	Glen Canyon Dam: 3.3-4 MWh Hoover Dam: 2.9-3.8 MWh	Glen Canyon Dam: 3.1-3.6 MWh Hoover Dam: 2.9-3.9 MWh	Glen Canyon Dam: 3.1-3.6 MWh Hoover Dam: 2.9-4 MWh

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Impact Category	Performance Indicator	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)**
Energy Generation of the Glen Canyon Dam and Hoover Dam Powerplants *(continued)*	Water year generation (MWh) under critically dry hydrology conditions	Glen Canyon Dam: 0-2 MWh Hoover Dam: 0-2.2 MWh	Glen Canyon Dam: 0-2.3 MWh Hoover Dam: 0-3 MWh	Glen Canyon Dam: 1.8-2.7 MWh Hoover Dam: 1.7-2.7 MWh	Glen Canyon Dam: 1.9-2.4 MWh Hoover Dam: 1.9-3 MWh	Glen Canyon Dam: 0-2 MWh Hoover Dam: 0.4-3.2 MWh	Glen Canyon Dam: 0-2 MWh Hoover Dam: 2-3.1 MWh
Glen Canyon Dam and Hoover Dam spillway infrastructure and life safety	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*.	**60%** of modeled futures meet *the preferred minimum performance*.	**70%** 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*.
	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.	**49%** of modeled futures meet *the preferred minimum performance*.	**56%** of modeled futures meet *the preferred minimum performance*.	**48%** of modeled futures meet *the preferred minimum performance*.	**43%** of modeled futures meet *the preferred minimum performance*.	**64%** of modeled futures meet *the preferred minimum performance*.	**64%** of modeled futures meet *the preferred minimum performance*.
	Percent of modeled futures in which *the Glen Canyon Dam spillway is not utilized*.	**65%** of modeled futures meet *the preferred minimum performance*.	**70%** of modeled futures meet *the preferred minimum performance*.	**66%** of modeled futures meet *the preferred minimum performance*.	**63%** of modeled futures meet *the preferred minimum performance*.	**76%** of modeled futures meet *the preferred minimum performance*.	**76%** 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*	**82%** of modeled futures meet *the preferred minimum performance*.	**76%** of modeled futures meet *the preferred minimum performance*.	**60%** of modeled futures meet *the preferred minimum performance*.	**50%** of modeled futures meet *the preferred minimum performance*.	**43%** of modeled futures meet *the preferred minimum performance*.	**40%** 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*.	**90%** of modeled futures meet *the preferred minimum performance*.	**87%** of modeled futures meet *the preferred minimum performance*.	**79%** of modeled futures meet *the preferred minimum performance*.	**78%** 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.	**91%** of modeled futures meet *the preferred minimum performance*.	**90%** of modeled futures meet *the preferred minimum performance*.	**83%** of modeled futures meet *the preferred minimum performance*.	**81%** of modeled futures meet *the preferred minimum performance*.	**71%** of modeled futures meet *the preferred minimum performance*.	**69%** of modeled futures meet *the preferred minimum performance*.
Glen Canyon Dam electricity rates and market value	Glen Canyon Dam electricity rates and market value	Results in much steeper rate trajectories and higher probabilities of major rate increases compared to the action alternatives.	Results in much steeper rate trajectories and higher probabilities of major rate increases compared to the other action alternatives.	Results in substantially smaller rate increases and less frequent rate adjustments than the No Action Alternative and Continued Current Strategies Comparative Baseline (CCS Comparative Baseline) under dry hydrologic conditions.	Results in substantially smaller rate increases and less frequent rate adjustments than the No Action Alternative and CCS Comparative Baseline under dry hydrologic conditions.	Results in substantially smaller rate increases and less frequent rate adjustments than the No Action Alternative and CCS Comparative Baseline under dry hydrologic conditions.	Results in substantially smaller rate increases and less frequent rate adjustments than the No Action Alternative and CCS Comparative Baseline under dry hydrologic conditions.

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Socioeconomics

Impact Category	Performance Indicator	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)
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. 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 6,000 fallowed acres. 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 49,000 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 102,000 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 205,000 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 67,000 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 7,000 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 52,000 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.

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Impact Category	Performance Indicator	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)**
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. 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 $10.3 million. 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 $77.6 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, 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 $691.8 million, $10.9 million, and $0.6 million, 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 market value of crops during a maximum shortage of 3.0 maf, with a loss in market value of about $52.4 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 $130.7 million. For California non-tribal agriculture entitlement holders, the Maximum Operational Flexibility Alternative is among the alternatives with a **high level of impact** on market value of crops during a maximum shortage of 4.0 maf, with a loss in market value of about $628.6 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 $101.0 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 $11.1 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 $83.1 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 $51.6 million.

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Impact Category	Performance Indicator	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)**
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. 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 80 jobs, $3.5 million in labor income, and $15.8 million in economic output. 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 800 jobs, $45.3 million in labor income, and $153.1 million in economic output.	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, with a loss of about 500 jobs, $31.2 million in labor income, and $104.5 million in economic output.	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 900 jobs, $46.8 million in labor income, and $207.6 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 5,000 jobs, $336.3 million in labor income, and $1.0 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, $57.1 million in labor income, and $199.2 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 90 jobs, $3.8 million in labor income, and $17.0 million in economic output. For California 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 over 100 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, $48.2 million in labor income, and $163.9 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 maximum shortage of 1.5 maf, with a loss of about 400 jobs, $30.7 million in labor income, and $102.8 million in economic output.

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Impact Category	Performance Indicator	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)**
Economic contributions and social conditions associated with changes in agriculture due to water shortages *(continued)*	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.	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. 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 fallowed agriculture lands expected from shortages, under this alternative.	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 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.	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.

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Impact Category	Performance Indicator	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)**
Economic contributions and value associated with Lake-Based and River-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 Alternatives, declining reservoir elevations at Lake Mead and Lake Powell 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. Operational changes increase the frequency and duration of low-elevation conditions at Lake Powell, reducing marina operability and shortening boating seasons are likely to further reduce economic contributions associated with recreational use at this reservoir. 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 recreation site access and navigation in Lake Powell 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).
	Percent of modeled futures in which *the annual recreational value*[12] *of whitewater boating exceeds 34 million dollars at least 90 percent of years*. This threshold indicates when modeled futures achieve recreation values at least as high as the lowest 10 percent of outcomes for recreation value based on recent historic hydrologic data (2020-2023).	**43%** of modeled futures meet *the preferred minimum performance*.	**50%** of modeled futures meet *the preferred minimum performance*.	**48%** of modeled futures meet *the preferred minimum performance*.	**9%** 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*.

[12] 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 Final SEIS to assess the effects on recreation value associated with white-water boating.

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	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)**
Economic contributions and value associated with Lake-Based and River-based Recreation *(continued)*	Percent of modeled futures in which *the annual recreational value*[13] *of angling exceeds 1.75 million dollars in at least 90 percent of years*. This value indicates when modeled futures achieve recreation values at least as high as the lowest 10 percent of outcomes for recreation value based on recent historic hydrologic data (2020-2023).	**25%** of modeled futures meet *the preferred minimum performance*.	**45%** of modeled futures meet *the preferred minimum performance*.	**1%** of modeled futures meet *the preferred minimum performance*.	**19%** of modeled futures meet *the preferred minimum performance*.	**21%** of modeled futures meet *the preferred minimum performance*.	**21%** of modeled futures meet *the preferred minimum performance*.
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).

[13] 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.

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

Impact Category	Performance Indicator	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)
Priority Group: Arizona CAP NIA-A and NIA-B	Percent of modeled futures in which greater than 80% of normal domestic delivery[14] occurs at least 90% of years. The higher the percentage, the more robust an alternative is with respect to achieving normal domestic deliveries.	**6%** of modeled futures meet the performance definition.	**1%** of modeled futures meet the performance definition.	**21%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.	**2%** of modeled futures meet the performance definition.	**3%** 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. The higher the percentage, the more robust an alternative is with respect to achieving normal domestic deliveries.	**6%** of modeled futures meet the performance definition.	**2%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.	**2%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.
Priority Group: Arizona CAP Indian, M&I, and 4(i)	Percent of modeled futures in which greater than 80% of normal domestic delivery occurs at least 90% of years. The higher the percentage, the more robust an alternative is with respect to achieving normal domestic deliveries.	**19%** of modeled futures meet the performance definition.	**2%** of modeled futures meet the performance definition.	**21%** of modeled futures meet the performance definition.	**3%** of modeled futures meet the performance definition.	**2%** of modeled futures meet the performance definition.	**3%** of modeled futures meet the performance definition.
	Percent of modeled futures, in which greater than 60% of normal domestic delivery occurs at least 90% of years. 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%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**9%** of modeled futures meet the performance definition.	**3%** of modeled futures meet the performance definition.	**100%** 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 occurs at least 90% of years. 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.	**100%** of modeled futures meet the performance definition.	**21%** of modeled futures meet the performance definition.	**57%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**3%** of modeled futures meet the performance definition.
	Percent of modeled futures, in which greater than 60% of normal domestic delivery occurs at least 90% of years. 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.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**61%** 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: Arizona present perfected right (PPR)	Percent of modeled futures in which greater than 80% of normal domestic delivery occurs at least 90% of years. 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.	**100%** of modeled futures meet the performance definition.	**21%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**3%** of modeled futures meet the performance definition.

[14] Normal delivery refers to a full supply of domestic water delivery throughout this table.

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Impact Category	Performance Indicator	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)
Priority Group: Arizona present perfected right (PPR) *(continued)*	Percent of modeled futures, in which greater than 60% of normal domestic delivery occurs at least 90% of years. 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.	**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 occurs at least 90% of years. 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.	**100%** of modeled futures meet the performance definition.	**21%** of modeled futures meet the performance definition.	**1%** of modeled futures meet the performance definition.	**2%** 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 occurs at least 90% of years. 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.	**100%** of of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**3%** of modeled futures meet the performance definition.	**2%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.
Priority Group: California PPR	Percent of modeled futures in which greater than 80% of normal domestic delivery occurs at least 90% of years. 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.	**100%** of modeled futures meet the performance definition.	**21%** 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 occurs at least 90% of years. 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.	**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 occurs at least 90% of years. 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.	**100%** of modeled futures meet the performance definition.	**21%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**50%** of modeled futures meet the performance definition.
	Percent of modeled futures, in which greater than 60% of normal domestic delivery occurs at least 90% of years. 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.	**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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Impact Category	Performance Indicator	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)**
Priority Group: Nevada Priority 8	Percent of modeled futures in which greater than 80% of normal domestic delivery occurs at least 90% of years. 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%** of modeled futures meet the performance definition.	**21%** of modeled futures meet the performance definition.	**13%** of modeled futures meet the performance definition.	**4%** of modeled futures meet the performance definition.	**50%** of modeled futures meet the performance definition.
	Percent of modeled futures, in which greater than 60% of normal domestic delivery occurs at least 90% of years. 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.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**55%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.
Comparison of impacts to senior and junior entitlements	Shortage to domestic water users across the full modeling period	N/A	>80% percent of normal delivery to some senior entitlements (AZ P2, P3, AZ PPR, California P4, CA PPR, NV P1-7) occurs in all potential futures. In contrast, for junior entitlements there are fewer potential futures in which there is any percentage of normal delivery. Minimal futures (0-10) in which AZ CAP NIA-A and NIA-B receive >80% normal delivery.	While this alternative results in more priority groups receiving domestic delivery closer to normal conditions, it results in shortage impacts on senior entitlements that would otherwise receive deliveries consistent with normal conditions.	>80 percent of normal delivery to some senior entitlements (AZ PPR, CA PPR, NV P1-7) occurs in 100% of potential futures. In contrast, for junior entitlements (AZ CAP NIA-A, NIA-B, M&I, AZ 4(i), CA P4, NV P8) there are fewer potential futures, and in some cases no potential futures, in which there is any percentage of normal domestic water delivery.	>80 percent of normal delivery to senior entitlements (AZ P2, P3, AZ PPR, PPR, NV P1-7) occurs in all potential futures. In contrast, for junior entitlements (AZ CAP NIA-A, NIA-B, M&I, AZ 4(i), CA P4, NV P8), there are fewer potential futures, and in some cases no potential futures, in which there is any percentage of normal domestic water delivery.).	While this alternative results in more priority groups receiving domestic delivery closer to normal conditions, it results in shortage impacts on senior entitlements that would otherwise receive deliveries consistent with normal conditions.
How would operational changes affect population and land use developed land use patterns?	Acres of developed land within the analysis area and potential for changes based on municipal water availability	Development in western Arizona served counties may slow due to water supply uncertainty; risk of infrastructure delays and constraints on new subdivisions under Arizona Department of Water Resources assured water supply rules.	Slightly improved predictability but concentrated shortages in Arizona could still limit growth in high-demand areas like Pinal and Maricopa Counties.	Shared shortages reduce localized development constraints; moderate reservoir levels support more stable urban expansion across Lower Basin states.	Large shortages and operational variability increase risk of development limitations basin-wide; uncertainty may deter investment in growth corridors.	Development largely protected in senior-rights areas (California metro regions); junior-rights Arizona communities face higher risk of growth restrictions.	Broader distribution of shortages may affect development in California and Nevada metropolitan areas, introducing regional planning challenges.
	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 western Arizona counties; 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 western Arizona counties.	Distributes shortages broadly, increasing exposure for senior priority holders California and potentially leading to widespread fallowing and crop switching across the Basin.

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Indian Trust Assets

Impact Category	Performance Indicator	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)
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*	**30%** of modeled futures meet *the preferred minimum performance*.	**62%** of modeled futures meet *the preferred minimum performance*.	**84%** of modeled futures meet *the preferred minimum performance*.	**91%** of modeled futures meet *the preferred minimum performance*.	**76%** of modeled futures meet *the preferred minimum performance*.	**85%** of modeled futures meet *the preferred minimum performance*.
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 the full period. The higher the percentage, the more frequently deliveries are estimated to remain consistent with normal delivery.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**21%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**4%** of modeled futures meet the performance definition.
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 the full period. The higher the percentage, the more frequently deliveries are estimated to remain consistent with normal delivery.	**100%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**21%** of modeled futures meet the performance definition.	**72%** of modeled futures meet the performance definition.	**100%** of modeled futures meet the performance definition.	**3%** of modeled futures meet the performance definition.
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 the full period. The higher the percentage, the more frequently deliveries are estimated to remain consistent with normal delivery.	**100%** of modeled futures meet the performance definition.	**2%** of modeled futures meet the performance definition.	**21%** of modeled futures meet the performance definition.	**4%** of modeled futures meet the performance definition.	**3%** of modeled futures meet the performance definition.	**3%** of modeled futures meet the performance definition.
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 the full period. The higher the percentage, the more frequently deliveries are estimated to remain consistent with normal delivery.	**6%** of modeled futures meet the performance definition.	**2%** of modeled futures meet the performance definition.	**21%** of modeled futures meet the performance definition.	**0%** of modeled futures meet the performance definition.	**2%** of modeled futures meet the performance definition.	**3%** of modeled futures meet the performance definition.
Trust Land (Arizona)	Acres of Fallowed Tribal Land	12,428	12,428 to 49,049	8,072 to 39,176	6,535 to 66,987	6,535 to 52,377	15,801 to 38,575
Trust Land (California)	Acres of Fallowed Tribal Land	0	0	1,298 to 5,092	0	0	579 to 2,803
Trust Land (Nevada)	Acres of Fallowed Tribal Land	0	0	131 to 656	0	0	131 to 460

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Visual Resources

Impact Category	Performance Indicator	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)
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.	**73%** of modeled futures meet *the preferred minimum performance*. **Third most acceptable** futures where Cathedral in the Desert is visible and accessible.	**74%** of modeled futures meet *the preferred minimum performance*. **Second most acceptable** futures where Cathedral in the Desert is visible and accessible.	**26%** of modeled futures meet *the preferred minimum performance*. **Fewest acceptable** futures where Cathedral in the Desert is visible and accessible.	**42%** of modeled futures meet *the preferred minimum performance*. **Second fewest** acceptable futures where Cathedral in the Desert is visible and accessible.	**76%** of modeled futures meet *the preferred minimum performance*. **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.	**27%** of modeled futures meet *the preferred minimum performance*. **Third fewest** futures where less of Glen Canyon and Hoover dams would be visible, with their increased visibility further dominating the local landscape character.	**26%** 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.	**74%** 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	**58%** 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.	**24%** of modeled futures meet *the preferred minimum performance*. **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.	
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 percent of the full modeling period*. The higher the percentage, the more likely calcium carbonate rings at Lake Powell will remain shorter than historic maximums.	**16%** of modeled futures meet *the preferred minimum performance*.	**16%** of modeled futures meet *the preferred minimum performance*.	**51%** of modeled futures meet *the preferred minimum performance*.	**38%** of modeled futures meet *the preferred minimum performance*.	**13%** 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 percent of the full modeling period*. The higher the percentage, the more likely calcium carbonate rings at Lake Mead will remain shorter than historic maximums.	**6%** of modeled futures meet *the preferred minimum performance*.	**30%** of modeled futures meet *the preferred minimum performance*.	**29%** of modeled futures meet *the preferred minimum performance*.	**32%** of modeled futures meet *the preferred minimum performance*.	**47%** of modeled futures meet *the preferred minimum performance*.	

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Impact Category	Performance Indicator	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)
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.	
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, 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.	

ES.6 References

Bureau of Reclamation (Reclamation). 2007. *Record of Decision: Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead*, Washington, D.C. Internet website: https://www.usbr.gov/lc/region/programs/strategies/RecordofDecision.pdf.

_____. 2019. Colorado River Drought Contingency Plans. May 2019. Internet website: https://www.usbr.gov/ColoradoRiverBasin/dcp/finaldocs.html.

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