
Appendix R

Response to Public Comment

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Acronyms and Abbreviations

Full Phrase

A.R.S.	Arizona Revised Statutes
BA	biological assessment
Basin	Colorado River Basin
BCPA	Boulder Canyon Project Act
BO	biological opinion
CAP	Central Arizona Project
CFR	Code of Federal Regulations
CRBPA	Colorado River Basin Project Act of 1968
CRSP	Colorado River Storage Project
CRSS	Colorado River Simulation System
CU&L	consumptive use and loss
Department	Department of the Interior
DOI NEPA Handbook	United States Department of the Interior Handbook of National Environmental Policy Act Implementing Procedures
DSPR	Dam Safety Priority Rating
EIS	environmental impact statement
ESA	Endangered Species Act
FWS	United States Fish and Wildlife Service
GCPA	Grand Canyon Protection Act of 1992
HFE	high-flow experiment
IBWC	International Boundary Water Commission
ICS	Intentionally Created Surplus
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
Lower Basin	Lower Colorado River Basin
LROC	Long-Range Operating Criteria
LTEMP	Long-Term Experimental and Management Plan
maf	million acre-feet
Mexico	United Mexican States
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
PA	Programmatic Agreement

Reclamation
ROD

Bureau of Reclamation
Record of Decision

UCRC
Upper Basin
U.S.
U.S.C.

Upper Colorado River Commission
Upper Colorado River Basin
United States
United States Code

Appendix R. Response to Public Comment

R.1 Introduction

A Notice of Availability of the Post-2026 Operational Guidelines and Strategies for Lake Powell and Lake Mead Draft Environmental Impact Statement (EIS) was published in the Federal Register on January 16, 2026, which kicked off a 45-day public review and comment period that ended March 2, 2026. The Draft EIS was available on the Bureau of Reclamation (Reclamation) [project website](#) along with an [interactive tool](#) designed to allow for easy comparison of impact analysis figures within the Draft EIS. This appendix provides an overview of the public review and comment process, how Reclamation addressed the comments, and details the grouping of similar comments into common themes with responses from Reclamation.

R.2 Summary of the Public Comment Period and Public Comment Analysis Process

Reclamation received 18,153 submissions during the Draft EIS comment period. Of the submissions, 7 were from state government entities, 23 from tribes, 4 from federal agencies, 28 from non-government organizations, 76 from local entities, 3 from academic or research institutions, 5 from elected officials, 21 from resource sector or business interests, and the remainder were from individuals. Twenty-three form letters were identified; 11,992 submittals had identical text to one of the 23 form letters and 5,298 had unique text in addition to the form letter text. Fifty-two submittals were noted as duplicate and only reviewed once. Unique submissions are available on the <https://www.usbr.gov/uc/DocLibrary/Memos/20240326-EstablishmentInterimOperatingGuidanceGlenCanyonDamLowReservoirLevels-TechnicalDecisionMemo-508-TSC.pdf>, and all public comments are retained in the project record.

All submissions were recorded and reviewed to identify substantive comments. A comment was considered substantive if it met one or more of the following criteria (United States [U.S.] Department of the Interior Handbook of National Environmental Policy Act Implementing Procedures [DOI NEPA Handbook 2026]):

- Questioned, with a reasoned basis related to the analysis, the accuracy of information in the EIS.
- Questioned, with a reasoned basis related to the analysis, the adequacy of, methodology for, or assumptions used for the analysis.
- Presented new information relevant to the analysis.
- Presented reasonable alternatives or issues outside those analyzed in the EIS.
- Presented relevant additional issues for analysis in the EIS.
- Prompted potential changes or revisions to one or more of the alternatives.

When multiple submissions had identical text, a form letter was established and reviewed once. The remaining copies of that submission were counted but not reviewed separately. If a submission had identical text but included additional unique text, the additional text was reviewed for substantive comments.

The comments received encompassed a wide array of policy and environmental issues, with many submissions addressing substantially similar subject matter or offering overlapping input. Given the high volume of substantive comments, and in accordance with Department guidance (DOI NEPA Handbook 2026, Appendix 1 Section 1), substantive comments were compiled in a database and organized into themes to allow similar comments to be reviewed and addressed collectively. This appendix presents those themes and Reclamation's responses. Using a theme-based approach provides a clear representation of the breadth and character of public input on each topic and offers greater context than a one-to-one comment-response format by reducing repetition and presenting comprehensive, synthesized responses. A table of contents (**Contents**, R-i) is provided to guide readers to specific subject areas reflecting the common themes and recurring issues identified in the comments received.

The themes summary and responses below were developed following the public comment period on the Draft EIS and during the development of the Final EIS. Many of the theme summaries and their associated comments led to changes in the Final EIS. Reclamation addressed comments consistent with the requirements of the DOI NEPA Handbook 2026. These requirements included but were not limited to analyzing a reasonable range of alternatives; using the best available scientific data; and not covering speculative analysis or analysis of impacts outside of the agency's control. In addition, this EIS does not attempt to interpret specific questions related to the Law of the River.

R.3 Public Comment Themes and Responses

R.3.1 Secretarial Authorities

Theme Summary

Commenters raised concerns that the Draft EIS does not adequately or accurately describe the Secretary's authorities and does not clearly identify which operational elements would require new or additional authority (e.g., statutory changes, new or modified Records of Decision (RODs), or interstate agreements). Commenters raised differing and conflicting interpretations of Secretarial authority and the Law of the River. For example, commenters in the Upper Colorado River Basin (Upper Basin) emphasize limits on Reclamation's role in administering Upper Basin apportionments, while Lower Colorado River Basin (Lower Basin) commenters urge broad authority to protect infrastructure and ensure Compact compliance, including through operation of Colorado River Storage Project (CRSP) facilities. Other areas of conflicting comments include how to distribute shortages in the Lower Basin, emergency authorities, and certain reservoir operations. These comments frequently fail to acknowledge that there are many conflicting legal views on Colorado River topics that have remained unresolved for the past century, and the comments then assert that the Secretary's decision not to endorse the commenter's particular view of a contested Colorado River legal theory is a flaw in the National Environmental Policy Act (NEPA) analysis.

Response

The Secretary of the Interior possesses broad authorities for the management and operation of the Colorado River System under applicable federal law and the Law of the River. While differing interpretations exist regarding the scope and application of certain authorities, this EIS is not intended to resolve or opine on such legal interpretations. Reclamation recognizes that implementation of certain operational elements analyzed in this EIS may or may not require additional authorities, and the Department of the Interior (Department) intends to implement any adopted guidelines in a manner consistent with applicable law and the Law of the River.

Particularly in the current context where Colorado River stakeholders have been unable to resolve disagreements over key aspects of applicable legal authorities, limiting the inclusion of operational elements in this EIS that are solely within an as yet nonexistent universal agreement regarding legal authority would unnecessarily constrain the reasonable range of alternatives and could limit the Department's ability to evaluate potential tools that could be developed or could be needed to address future operational and water supply challenges in the Colorado River Basin (Basin).

The EIS discusses additional authorities that may or may not be needed to implement the Preferred Alternative, and the Department may also wish to consider specific identification of authorities needed to implement future operations that could be the result of a consensus proposal.

R.3.2 1922 Colorado River Compact Compliance**Theme Summary**

Commenters expressed differing views regarding 1922 Compact compliance and how 1922 Compact-related obligations between the Upper Basin and Lower Basin should be reflected in the range of alternatives and impact analysis. Lower Basin commenters stated that the Draft EIS does not analyze operations that are aligned with the Lower Basin interpretation of Compact compliance, including CRSP Upper Initial Unit operations, and that the Lower Basin would be disproportionately affected. Some commenters also expressed that the Draft EIS does not clearly articulate whether, or how, assumptions regarding 1922 Compact interpretations account for United Mexican States (Mexico)-related delivery obligations, Lower Basin tributaries, surplus determinations, or the extent to which Lake Powell releases should reflect those considerations. These comments generally seek greater integration of 1922 Compact compliance considerations into the alternatives and explanation of how differing interpretations are reflected in the analysis.

Response

Section 602 of the Colorado River Basin Project Act of 1968 (CRBPA) required the Secretary to propose and adopt criteria for the coordinated long-range operation of the reservoirs constructed and operated under the authority of the CRSP Act of 1956, the Boulder Canyon Project Act of 1928 (BCPA), and the Boulder Canyon Project Adjustment Act. The Secretary adopted such Long-Range Operating Criteria (LROC) in 1970 and has been operating the Colorado River consistent with the LROC since that time. The LROC and Guidelines (2001, 2007) were adopted in a manner designed to comply with the 1922 Compact.

As with the 2001 Interim Surplus Guidelines and the 2007 Interim Guidelines, it is the Department's intention that post-2026 guidelines be used to implement the LROC, and the Department is not modifying the LROC at this time. Further, with post-2026 guidelines, the Department is not interpreting the legal meaning of the 1922 Colorado River Compact or resolving differing interpretations by Basin States, Basin Tribes, and other stakeholders.

Reclamation will follow all relevant provisions of federal law to implement the proposed federal action, including relevant provisions of the Law of the River. Reclamation recognizes that, under Article II(2) of the LROC, the "objective shall be to maintain a minimum release of water from Lake Powell of 8.23 [million acre-feet (maf)]." 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. To inform Basin partners and stakeholders of the relevant considerations for the proposed federal action, Reclamation identified and published any annual deficits below the objective release of 8.23 maf, as well as relevant 10-year metrics of particular interest at Lee Ferry, such as the 10-year consecutive aggregate flow, along with any deficit in the 10-year consecutive aggregate flow (such as, any deficit from 82.5 maf and 75 maf), see **Section 1.8.2.2**, for further discussion.

While the LROC are "administered consistent with applicable federal laws," Reclamation intends and has expressly noted in the Final EIS that releases from Lake Powell pursuant to the LROC or any adopted guidelines "shall not prejudice the position of either the Upper or Lower Basin interests with respect to the required deliveries at Lee Ferry pursuant to the Colorado River Compact." (Article II(5) of the LROC), see **Section 1.8.7**, for further discussion.

R.3.3 Upper Initial Unit Operations

Theme Summary

Upper Basin stakeholders generally noted that the CRSP Upper Initial Unit use should not be included in alternatives as it is not in geographic scope and that inclusion of CRSP Upper Initial Units exceeds Secretarial authorities. Conversely, Lower Basin stakeholders generally noted that the alternatives should include more CRSP Upper Initial Unit use, including operations outside existing RODs for Compact compliance. Additionally, commenters noted that analysis of impacts from CRSP Upper Initial Unit operations is not adequate.

Response

Given that the description of the proposed federal action has, from the outset, contemplated the use of CRSP Upper Initial Units, it is appropriate to include the effects of these CRSP Upper Initial Unit releases on Lake Powell in the analysis. The range of CRSP Upper Initial Unit operations is within existing federal authorities and within the scope of their respective existing RODs, and these operations have therefore already undergone NEPA analysis. This EIS focuses on alternatives for changing operations within the geographic scope identified in **Section 1.5.1** of the Final EIS, which begins at full pool of Lake Powell and extends downstream along the mainstream Colorado River floodplain to the Southerly International Boundary with Mexico. There is no NEPA requirement that would require a broader geographic scope for this effort. Any operation of CRSP Upper Initial Units outside of RODs would occur only under emergency circumstances. While the Secretary will

consider and prioritize operations at these facilities that are consistent with existing RODs, the Secretary retains the authority to operate outside those RODs if necessary. The modeling assumptions regarding operation of the CRSP Upper Initial Units presented in this Final EIS are not intended to, and do not, limit the Secretary's ability to operate these facilities as necessary to respond to hydrologic conditions in accordance with applicable federal law, including operations for the authorized purposes stated in the CRSPA. Such operations are not addressed in this NEPA analysis. If emergency conditions arise, any operational decisions will be made at that time based on the then-current conditions with appropriate levels of analysis. Proactively changing operations of CRSP Upper Initial Units beyond their existing RODs, along with other connected actions, is not part of the proposed action and can be analyzed through separate NEPA processes if warranted. The alternatives represent a reasonable range of releases from CRSP Upper Initial Units, and the level of analysis provided is appropriate for this EIS. For discussion of issues related to Compact compliance, see **Section R.3.2**, 1922 Colorado River Compact Compliance.

R.3.4 Upper Basin Demands, Shortage, and Conservation

Theme Summary

Commenters raised concerns about assumptions related to Upper Basin demands, the treatment of hydrologic shortage in the Upper Basin, and the nature and feasibility of Upper Basin conservation measures.

Response

With respect to the Upper Basin depletion demands, it is important to distinguish between the depletion demands input to the model and the Upper Basin depletion calculated by the model. The Upper Basin baseline depletion demands used as input to the Colorado River Simulation System (CRSS) model were developed from the Upper Colorado River Commission's (UCRC) updated 2016 Depletion Demand Schedule (revised in 2022). In coordination with the Upper Division States, the UCRC developed decadal projections of depletions by sector at the state level to support long-term planning efforts. These projections represent anticipated demand under ideal hydrologic and economic conditions and are not supply-limited. The Arizona portion of the Upper Basin demand schedule was developed by Reclamation based primarily on the 2018 Tribal Water Study demand schedules and is primarily comprised of Navajo Nation uses. Collectively, these baseline demands represent the current best available data for input to CRSS.

In conjunction with incorporating this updated depletion demand schedule, CRSS was updated and calibrated to better characterize the variability and range of modeled Upper Basin depletions and to reduce streamflow bias during a historical verification period. **Figures I-1 to I-6** in the Final EIS demonstrate that, although the depletion demands input to the model exceed historical depletion (i.e. consumptive uses and losses [CU&L]) and increase over time, Upper Basin modeled depletion is constrained by water availability (i.e., varying hydrologic conditions) and is therefore comparable to observed historical use. In the model, calibration was achieved by adjusting the water available for diversion by agricultural users. As a result, modeled depletions are better represented volumetrically (on a reach-by-reach basis in CRSS) but may not reflect actual sector- and water user-level depletions—which depend on demand, geographic location (e.g., tributary versus mainstem), priority, and water availability, and are not represented at the CRSS model scale.

With respect to hydrologic shortage, the difference between the Upper Basin depletion demand schedule input to CRSS and the Upper Basin depletion calculated by the model represents modeled hydrologic shortage given water availability. **Figure I-7** shows the Upper Basin modeled hydrologic shortage calculated using CRSS from 2027 to 2060. As noted above, while basin-wide Upper Basin modeled hydrologic shortage is better represented volumetrically due to model calibration, the volume does not account for important nuances that affect Upper Basin hydrologic shortage, such as water user-specific demand, geographic location (e.g., tributary versus mainstem), priority, and water availability. However, it is reasonable for the EIS analysis to represent the reality that, in many years, depletions by some Upper Basin users are constrained by available supply in their respective locations. For a historical representation of Upper Basin hydrologic shortage, refer to Reclamation's *Upper Colorado River System Consumptive Uses and Losses Report*, available online.

Refer to **Appendix L**, Upper Basin States Depletion Schedules, for additional information on the Upper Basin depletion schedules, **Appendix A**, CRSS Model Documentation, for CRSS calibration, and **Appendix I**, Sensitivity Analysis – Effects of Alternate Upper Basin Demand Scenarios on Operations at Lake Powell and Lake Mead, for additional information on the operational impacts of varying Upper Basin demands on Lake Powell and Lake Mead. Reclamation will continue to work with the UCRC and the Upper Division States and other stakeholders to update the depletion demand schedules as appropriate.

With respect to the nature and feasibility of Upper Basin conservation measures, the viability of the proposed conservation programs is unknown. For purposes of environmental impact analysis, and to analyze the full impacts of the alternatives, it was assumed that the voluntary conservation targets would be achieved. Because the specific entities that might participate in a voluntary conservation program are not known, additional analysis of impacts on specific entities is not possible.

Modeled Upper Basin conservation spans a broad range of volumes and operational approaches, some of which vary based on hydrologic conditions. **TA 3**, Hydrologic Resources, includes a sensitivity analysis comparing the impacts of including (conservation on) and excluding (conservation off) conservation activities within the alternatives, illustrating the range of impacts associated with varying levels of Upper Basin conservation.

R.3.5 LROC Implementation

Theme Summary

Commenters raised concerns regarding implementation of the 1970 LROC, particularly the role and interpretation of the “objective” to “maintain a minimum release of 8.23 maf” annually from Lake Powell and the calculation of the 602(a) storage. Some commenters asserted that the No Action Alternative improperly treats 8.23 maf as a fixed annual release requirement, while others contended that the Basic Coordination Alternative improperly allows releases below 8.23 maf. Additional comments asserted that 602(a) storage is calculated incorrectly or inconsistently with the LROC and related operating criteria.

Response

The Secretary of the Interior adopted LROC in 1970 in compliance with Section 602 of the CRBPA (Public Law 90-537). The narrative provisions of LROC are used to inform determinations with respect to storage reservoirs in the Basin under the No Action Alternative. While LROC provides that 8.23 maf is an objective for a minimum annual release, a reasonable representation of future hydrologic conditions, including releases below 8.23 maf, is necessary for comparison under the Basin Coordination Alternative.

Among other provisions, the LROC provide that “the objective shall be to maintain a minimum release of water from Lake Powell of 8.23 maf for that year.” Reclamation recognizes that entities in the Basin have different legal positions regarding how this provision incorporates other Law of the River elements to determine annual releases. The Secretary has expressly recognized that variation in releases of water above and below the minimum objective release of 8.23 maf can, in appropriate circumstances, be adopted (Norton 2005). The LROC expressly note that releases from Lake Powell pursuant to the LROC or any adopted guidelines “shall not prejudice the position of either the Upper or Lower Basin interests with respect to the required deliveries at Lee Ferry pursuant to the Colorado River Compact.”

Comments received on the Draft EIS illustrate a longstanding dispute between the Upper Basin and the Lower Basin about whether annual releases can be lower than 8.23 maf. This dispute was not resolved during the period from 1970-2007 when the LROC was the sole basis for coordinated reservoir operations, and conditions never presented themselves during this period that caused the Secretary to make a decision about releases lower than the LROC’s 8.23 maf objective. Instead, poor hydrology in the early 2000s prompted development of the 2007 Guidelines that adopted objective criteria for annual release volumes that implemented LROC’s narrative criteria concerning release objectives. This NEPA process builds on the approach of the 2007 Interim Guidelines to adopt new, objective criteria to implement LROC. The EIS accordingly applies LROC provisions consistently for purposes of evaluating environmental impact and does not resolve differing legal interpretations raised by commenters. No additional analysis is recommended.

Despite the operational challenges due to prolonged drought, the release from Lake Powell over the term of the 2007 Interim Guidelines has met or exceeded the minimum objective release of 8.23 maf in 13 out of 19 years, and has averaged 8.5 maf over the 2008-2026 period. Going forward, the Department recognizes the continued importance of operating to achieve a minimum objective release of 8.23 maf, but meeting this objective release has been and will be increasingly difficult in a constrained system of low reservoir elevations, declining river flows, and the need to protect the operational reliability of Glen Canyon Dam.

R.3.6 Glen Canyon Dam and Hoover Dam Infrastructure**Theme Summary**

Commenters asserted that the Draft EIS does not adequately address infrastructure risks at Glen Canyon Dam and Hoover Dam. Specifically, commenters requested that the EIS consider potential infrastructure fixes, repairs, or physical modifications as part of the alternatives, and provide

additional information regarding ongoing or planned processes to address known and emerging infrastructure constraints.

Theme Response

The Department discussed the operational risks at Glen Canyon Dam in **Section 1.8.4.1** of the Final EIS, which is based upon the current operational guidance for the dam (Reclamation 2024), and expressly states that low reservoir conditions have brought to light risks that could compromise the reliability and operational flexibility of Glen Canyon Dam and affect the ability to meet critical downstream water supply needs.

Specific infrastructure modifications are not currently contemplated as components of individual alternatives within the EIS, since pursuing them would not be dependent on adopting specific operational guidelines. Infrastructure modifications are outside the scope of the EIS because they would constitute an action separate from operation of Glen Canyon and Hoover Dams.

Reclamation is analyzing feasible paths for reducing risks and impacts related to infrastructure. Should Reclamation move forward with infrastructure modifications, it would need to complete additional studies, seek funding, and undertake separate NEPA compliance. Future operations would account for infrastructure modifications.

With respect to Glen Canyon Dam infrastructure specifically, which impacts releases to the Lower Basin, some alternatives include releases when Lake Powell elevation is below the critical threshold of 3,490 feet. Therefore, the possibility of releases at these low elevations is captured in the EIS. Operational actions within the scope of the EIS, such as additional releases from CRSP Upper Initial Units to release additional water if needed to protect critical infrastructure at Glen Canyon Dam, are also described. Furthermore, infrastructure modifications to access water stored below 3,490 feet would have a relatively insignificant impact on releases long-term because the volume of water stored below this elevation is relatively small—less than 3.743 maf—and would effectively only be able to be released downstream once.

R.3.7 Lower Basin Shortage and Use

Theme Summary

Comments on Lower Basin shortage and use covered topics associated with the interaction between conservation and shortage, the total volumes of shortage specified in the alternatives, the distributions of shortage within the Lower Basin, including dead pool-related reductions, preferences on allowable uses in the Lower Basin, and the quantification and modeling of Lower Basin demands. Each topic is summarized and responded to in the following sub-sections.

Theme Response

The EIS analyzed a broad range of release, delivery, shortage, and distribution options for Colorado River operations. Modeling assumptions regarding the distribution of Lower Basin shortages and Lower Basin conservation activities were developed to enable the analysis of the environmental effects across alternatives and to provide for a comparison of impacts given different methodologies of distributing shortages. These modeling assumptions are not intended to interpret specific

provisions of the Law of the River or the state law appropriation process of any of the Basin States. Responses to each topic are included below.

R.3.7.1. Interaction between Conservation and Shortage

Summary

Comments suggested that there should be a focus on conservation before shortages are implemented, and that conservation should not be allowed to reduce or satisfy required shortages.

Response

Voluntary conservation through Intentionally Created Surplus (ICS) and system conservation agreements has been a critical tool in the Lower Basin, helping reduce system risk and avoid involuntary reductions. Since 2012, approximately 10.4 maf of additional voluntary conservation has been created by the Lower Basin and Mexico, equivalent to approximately 150 feet in Lake Mead elevation. While future system conservation agreements funded by the federal government are subject to the availability of future federal funding, it is reasonable to expect that ICS-like tools will continue to be used in the Lower Basin to manage and may reduce the likelihood of large-scale mandatory reductions. Therefore, all action alternatives in the Draft EIS, except for the Basic Coordination Alternative (which assumes no future agreements are reached), included future conservation pools in Lake Mead. The different action alternatives also included a range of assumptions related to the ability to use conserved water to meet or offset required reductions. Additional details on Lower Basin Conservation are included in **Section R.3.8**, Lower Basin Conservation and Storage and Delivery of Conserved System and Non-System Water.

R.3.7.2. Total Shortage Volume

Summary

Comments spanned a wide range, from total shortages being insufficient to protect critical elevations at Lake Powell and Lake Mead (largely focused on the No Action and Basic Coordination alternatives), to the proposed shortage volumes being unacceptably high when considering potential socioeconomic impacts.

Response

The Draft EIS analyzed a range of shortage volumes up to 4 maf/year and reported “dead pool related reductions” – the reductions that occurred in modeling due to the physical limitations of infrastructure when Lake Mead is near or at dead pool. The maximum specified shortage volume was sufficiently protective under most conditions. For example, the Maximum Operational Flexibility Alternative, which included shortages up to 4 maf/year, avoided dead pool-related reductions in nearly 100 percent of years in dry conditions and 79 percent of years in critically dry conditions. Given the extremely dry streamflow conditions analyzed, which extend well beyond droughts in the observed historical record, it was not expected that shortages would be protective under all hydrologic conditions. See **Appendix F**, Approach to Hydrologic Uncertainty, for more details. Comparing the maximum specified shortage in each alternative and the associated dead pool-related reductions provides information on the tradeoffs between higher/lower shortages and higher/lower dead pool-related reductions. The maximum specified shortage volume analyzed was

4.0 maf while the maximum dead pool-related reduction analyzed was 6.54 maf. Reclamation acknowledges that there would be socioeconomic and other impacts from shortages, which were analyzed and disclosed in the Draft EIS, and which are unavoidable under any combination of alternatives.

R.3.7.3. Distribution of Shortage within the Lower Basin

Summary

An almost universal comment received was that entities other than the commenting entity should bear shortage reductions, or that the commenting entity should not be shorted at all or as much. There were additional variants on this topic, about which commenters held opposing views, including that a distribution of shortage other than by priority is illegal, that the existing priority distribution systems are not equitable, and that the priority system no longer serves the residents of the Lower Basin. Related comments on dead pool-related reductions were conflicting; some commenters recommended distributing reductions pro rata, while others recommended distributing them by priority, and still others identified specific users that should not be affected by dead pool-related reductions. Comments also identified that neither the population and land use nor the socioeconomic impacts of dead pool-related reductions were analyzed.

Response

The Draft EIS analyzed shortages according to several different methodologies to provide a range of impacts across resources for the different shortage distributions. In accordance with the Consolidated Decree, the CRBPA, and other key provisions of the Law of the River, the Secretary has the authority to declare and allocate shortages to the Lower Division States. Some explicit guidance is given by the Supreme Court and Congress with regard to how shortages would be allocated according to priority, and additional detail is based on intra-state priority systems including as established by law and contract, and federal water delivery contracts executed pursuant to Section 5 of the BCPA. The methodologies incorporated this guidance and variations in distribution among users to encompass potential shortage sharing agreements. Modeling assumptions with respect to the distribution of shortages to the Lower Division States and Mexico were necessary in order to analyze potential impacts on hydrologic and other environmental resources.

The Draft EIS specifically includes a methodology that is inconsistent with the Decree and CRBPA (i.e. distribution of reductions pro rata to all entities that receive water from the mainstream in the Lower Basin pursuant to the Decree). Reclamation acknowledges that it would need additional agreements or other legal authority to implement any operations that are inconsistent with the Decree and CRBPA. But Reclamation has also determined that, based on public input received during the scoping and alternative development phases of the NEPA process, analysis of these operations will present a broader range of operations and impacts for agency and stakeholder consideration, review, and input, and will foster meaningful and informed decision-making among Reclamation and Basin stakeholders.

Reclamation's modeling assumptions for the distribution of dead pool-related reductions were documented in **Appendix A**, CRSS Model Documentation, and are meant for modeling purposes

only as no alternative included any specific criteria or methodology for the distribution of dead pool-related reductions. This distinction has been clarified in **Appendix A**.

While the population, land use, and socio-economic impacts of dead pool-related reductions were not specifically analyzed in the Draft EIS because they fall outside federal control, the range of modeled shortages under the alternatives is sufficient to provide for a general understanding of possible impacts, including a full reduction of domestic and irrigation water in some areas. The foreseeable consequences of full reductions in water supply are described in **TA 16**, Socioeconomics and **TA 17**, Population and Land Use; and Shortage Allocation Model and Alternative Distribution Model results are shown in **Appendix C**, Shortage Allocation Model and Alternative Distribution Model Documentation, for shortages of 5 maf per year.

R.3.7.4. Preferences on Allowable Uses in the Lower Basin

Summary

Commenters expressed a variety of preferences for how water should be used. Golf courses, surf parks, and decorative lagoons were suggested to be eliminated from Lower Basin uses before shortage is considered as a policy tool. Other commenters urged protection of legal rights to use water, including for purposes that support community amenities.

Response

In general, the 1922 Colorado River Compact contemplated domestic and agricultural uses of Colorado River water, as defined in Article II(h). Relevant state or local laws may regulate or limit water use, or types of economic developments, within their jurisdictions. Any analysis of potential limitations on beneficial water use, including review under 43 Code of Federal Regulations (CFR) Part 417, are outside the scope of this EIS.

R.3.7.5. Quantification and Modeling of Lower Basin Water Demands

Summary

Some commenters expressed concern that modeled Lower Basin water demands, in the Shortage Allocation Models and CRSS modeling, were, for some users, unrealistically high and reached full use of entitlements sooner than should be expected. Other commenters expressed concern that their individual modeled consumptive use under-represented their planned increase of water use, and that the modeling resulted in limited availability of water to junior users and had the result of skewing risk to those users. Additionally, comments expressed that evaporation, system losses, and Lower Basin tributary use should be included in Lower Basin use to fully represent the balance of supply and demand.

Response

Modeling assumptions with respect to the projections of future water demand in the Lower Basin were necessary in order to analyze potential impacts on hydrologic and other environmental resources and are not intended to interpret specific provisions of the Law of the River or the state laws of any of the Basin States.

The Shortage Allocation Modeling was based on assumed full use (demand) of all entitlements. The Lower Basin demands used in CRSS were assumed to start near recent levels, including recent consumptive use efficiency, and then grow to full entitlement by 2040 for all users except the junior-most entitlement holder in each state. This approach resulted in an analysis that disclosed the maximum impacts to the junior users for priority based shortages; disclosed the maximum impacts to higher priority users for pro rata based shortages; analyzed a period where not all users were at full entitlement; analyzed a period where all higher priority users were at full entitlement; and provided a range of impacts on the other flow-based resources at and downstream of Hoover Dam due to the growing demands used in CRSS. This approach broadly encompasses any effects from actual uses and shortage sharing. Moreover, this approach is appropriate for the analysis as it provides maximum impacts to shortage levels and water users due to dry hydrology.

Lower Basin evaporation, system losses, and Lower Basin tributary use are all included to varying degrees in CRSS, meaning that all analyses show how the specified Lake Powell operations and Lower Basin shortage volumes affect the system conditions after Lower Basin evaporation, system losses, and historical levels of Lower Basin tributary use occur. CRSS explicitly models evaporation at Lake Mead, Lake Mohave, and Lake Havasu; **Appendix A**, CRSS Model Documentation has been updated to document this. System losses in the Lower Basin include flows to Mexico in excess of the 1944 Water Treaty, water bypassed pursuant to International Boundary Water Commission (IBWC) Minute 242, transmission losses, phreatophyte use, and other evaporative losses. Both flows to Mexico in excess of the 1944 Water Treaty and water bypassed pursuant to IBWC Minute 242 are explicitly modeled in CRSS using historical average values; **Appendix A** has been updated to document these values. Transmission losses, phreatophyte use, and other evaporative losses are included in the development of Lower Basin inflows used in CRSS. Any losses that occur downstream of Hoover Dam are implicitly included by lowering the computed intervening flow in these reaches. Then, CRSS uses these inflows, which reflect a historical range of these losses.

CRSS currently relies on historical gage inflow for the Lower Basin tributaries, including the Little Colorado, Virgin, and Bill Williams Rivers. The gage flow for these tributaries reflects all upstream uses, thus CRSS incorporates the historical range of use that has occurred in these tributaries. In the 2012 Colorado River Basin Water Supply and Demand Study, Reclamation committed to developing natural flows for the Little Colorado, Virgin, and Bill Williams Rivers. In January 2026, Reclamation published the updated and consistent 1971-2024 CU&L data for these tributaries. Reclamation is currently working to incorporate these data into the Natural Flow and Salt model to develop Lower Basin natural flow for these years; however, before these natural flows can be used in CRSS, future demand projections in these same tributaries need to be developed with Arizona, Nevada, Utah, and New Mexico, and Reclamation will need to consider extending the CU&L estimates back through 1906. While CRSS considers tributary use for modeling purposes, Lower Basin tributary uses are outside the scope of this EIS and separate from mainstream operations.

R.3.8 Lower Basin Conservation and Storage and Delivery of Conserved System and Non-System Water

Theme Summary

Comments on Lower Basin conservation and storage and delivery of conserved system and non-system water addressed two key areas. First, the comments discussed the storage and delivery of conserved water by users, currently referred to as ICS, and the extension or replacement of ICS. Second, they included comments on system conservation, the creation of which has historically been federally funded, to benefit Lake Mead elevations, and not recoverable by users. Comments were generally supportive of both system conservation and ICS, with specific concerns that varied by commentor, and with some comments noting the performance benefits and importance of incorporating flexible, adaptive tools for conserving, storing, and managing water. The comments received on system conservation expressed support for continued funding of system conservation, with some expressing the importance of it being verifiable.

Comments on ICS generally supported at least maintaining the existing ICS rules, with several comments expressing the need to expand participation in ICS, modify the rules for when and how ICS is used, and improve the consistency of what conservation is eligible for ICS. Multiple comments expressed the need for ICS to be operationally neutral with respect to reservoir operations. There were conflicting comments regarding whether ICS should be allowed to offset/meet required Lower Basin shortages. Some commenters noted that ICS storage must remain fully isolated downstream of Lee Ferry while others highlighted the benefits of being able to move stored water between Lake Powell and Lake Mead to manage water supply risks, benefit resources, and protect critical infrastructure. Some commenters are concerned that ICS deliveries effectively provide junior priority entitlement holders with a senior priority. Some comments stated that Reclamation failed to identify the agreements or authorities that are needed for protection pools in the Enhanced Coordination and Maximum Operational Flexibility Alternatives. Finally, some comments expressed that any future ICS program should include transparent accounting and verifiable tracking.

Theme Response

Voluntary conservation through ICS and system conservation agreements has been a critical tool in the Lower Basin, helping reduce system risk and avoid involuntary reductions. Since 2012, approximately 10.4 maf of additional voluntary conservation has been created by the Lower Basin and Mexico, equivalent to approximately 150 feet in Lake Mead elevation. While future system conservation agreements funded by the federal government are subject to the future availability of federal funding, it is reasonable to expect that ICS-like tools will continue to be used in the Lower Basin to manage and may reduce the likelihood of large-scale mandatory reductions. All conservation is verifiable, and Reclamation has documented users' and states' total water use and conservation in the Lower Colorado Mainstream Accounting and Water Use Report each year.

All alternatives modeled in the Draft EIS respected the delivery rules associated with ICS that exists in Lake Mead at the end of 2026, while all action alternatives (except for the Basic Coordination alternative) included a new storage and delivery mechanism with varying rules and additional flexibilities. Across these alternatives, the rules for the new mechanism evaluated both operationally

neutral and non-operationally neutral storage mechanisms, varied the maximum accumulation and annual storage and delivery constraints, and varied the conditions when delivery of ICS was not allowed (e.g., when Lake Mead is below a specified elevation). Additionally, the Maximum Operational Flexibility Alternative evaluated the ability to store water in Lake Mead or Lake Powell, while the other action alternatives limited the storage to Lake Mead. The Draft EIS evaluated a range of options so that the eventual preferred alternative would fall within the range of already evaluated options and conditions. The specific rules for any new storage and delivery mechanism would be based on consensus agreements.

Modeled water deliveries, which may include delivery of existing ICS or new stored water in a particular scenario, followed the storage and delivery rules outlined in each alternative in conjunction with how a water user's entitlement was modeled in the alternative. Modeled delivery of existing ICS or delivery of new stored water are independent of a water user's priority and only follow the rules explored in the alternative. **Section R.3.1**, Secretarial Authorities discusses the approach taken in the Draft EIS with respect to specific authorities for different options, including the protection pools in the Enhanced Coordination and Maximum Operational Flexibility Alternatives. ICS creation and delivery are documented in the Lower Colorado Mainstream Accounting and Water Use Report each year and would continue to be with any ICS-like program in the future.

R.3.9 Tribal Considerations

Theme Summary

Across the comment letters submitted by Basin Tribes, several overarching considerations emerged, including the protection of tribal rights and trust assets, interpretation of legal authorities, concerns with the adequacy of the technical impact analysis, and the lack of meaningful tribal consultation and involvement in the Post 2026 process. Comments from tribes that relate to particular issues are captured in specific themes and are addressed in the corresponding sections where those themes are discussed.

Tribes expressed that the Draft EIS does not adequately acknowledge, analyze, or protect tribal water rights, Indian trust assets, or the legal authorities that govern Colorado River operations. Concerns include the lack of clear recognition of existing tribal rights; the potential for unlawful or inequitable shortages to tribes; improper treatment of system losses; and inadequate analysis of cultural, environmental, and socioeconomic impacts. Tribes also emphasized the need for a dedicated Federally Managed Water Resources Pool or similar mechanism in Post 2026 operations to ensure tribal rights are protected and not diminished during shortages. Tribes stated that the Draft EIS exceeds Reclamation's operational authority and fails to analyze required Upper Basin delivery obligations. Tribes raised concerns that the Draft EIS lacks required NEPA analysis, including impacts of shortages, dead pool conditions, Central Arizona Project (CAP) water quality, system infrastructure constraints, socioeconomic impacts, and mitigation measures. Tribes also noted that viable alternatives were not considered or analyzed, such as the alternative that the Gila River Indian Community submitted. Comments also highlight that some modeling assumptions are inappropriate or incomplete, including assumptions about Upper Basin actions, hydrology, and Lower Basin priority structures. In addition, some tribes have expressed a general concern that their water rights are not always fully usable on their own lands, which can negatively affect their

communities and governance. For example, Colorado River Indian Tribes (CRIT) has commented that, as a result, despite being authorized under *Arizona v. California* and the Law of the River, CRIT experiences harm to its members, its culture, and its sovereignty when water allocated to CRIT is unable to be consumptively used on reservation lands and is diverted from the Colorado River for consumptive use elsewhere in the basin without CRIT's approval.

Tribes requested government-to-government consultation, both during the development of the Draft EIS and in future decision processes. They emphasized the need for consultation that encompasses cultural practices, traditional cultural places, sacred sites, treaty and Winters rights, and Indian trust assets, as well as for transparency about how tribal input influences alternative development. Tribes also stated that Reclamation failed to consult under the National Historic Preservation Act (NHPA) and that overall engagement to date has been insufficient. More broadly, tribes seek meaningful, formalized consultation processes aligned with existing mechanisms and a role in the Post 2026 process comparable to the Basin States.

Theme Response

Reclamation identified tribal water entitlements in the Basin (by tribe, and also grouped by priority, location, or other characteristics if applicable), Indian trust assets, and the legal authorities that govern Colorado River operations. Nothing in the EIS is intended to modify tribal water entitlements or preclude future tribal water rights settlements or adjudications. Reclamation acknowledged that the agency cannot unilaterally implement certain operational elements included and analyzed in the Draft EIS, as many of these actions would require implementation agreements among various Basin entities (see **Section 2.3**). Should Basin States and tribes develop agreements that avoid or mitigate any needed reductions or otherwise share shortages, the broad range of alternatives analyzed in the Draft EIS provides environmental compliance for alternative approaches to distributing water deliveries and any shortages, including approaches that differ from a priority-based shortage distribution in the Lower Basin. Many viable elements submitted through alternative proposals were incorporated into the broad range of alternatives evaluated in the Draft EIS. Reclamation also believes the Draft EIS adequately analyzes, to the extent required, the potential impacts of operations and shortage distribution on tribes and is consistent with the Department's trust responsibilities.

Throughout the Post-2026 NEPA process, Reclamation has consulted both formally and informally with Basin Tribes. This includes several invitations at critical milestones for government-to-government consultation, as well as regular communication and updates provided through the monthly Reclamation-hosted Tribal Information Exchanges and other tribal forums to which Reclamation leadership and staff are invited, such as Ten Tribes Partnership meetings and Inter Tribal Council of Arizona meetings. In addition, during the alternatives development phase, a tribal workgroup was convened and met regularly with tribal staff and representatives to identify and discuss tribal priorities and ensure these were reflected within the Draft EIS range of alternatives. The ROD will include language describing future tribal consultation requirements for implementation decisions related to post-2026 operations. Regarding NHPA consultation, this issue is outside the scope of the EIS process and is addressed through the NHPA process.

R.3.10 Hydrologic Modeling Assumptions

Theme Summary

Commenters argued that the technical analysis was inappropriate due to several modeling assumptions. Some described the initial reservoir conditions as optimistic and outdated. Others characterized the future hydrology assumptions as unrealistic, lacking predictability, and inconsistent with the best available science, including climate change. Commenters also described Upper Basin demand projections as showing unrealistic growth. With respect to Lower Basin demands and system losses, commenters stated that these were not fully represented, citing specific concerns including the exclusion of tributary uses and assumptions related to 2040 build-out. Additional comments noted that "gap water" is not clearly identified or consistently described throughout the Draft EIS, and that evaporation assessments on reservoir pools should be more clearly described.

Response

With respect to initial conditions, the choice in November 2024 to use a wide range of 2027 initial reservoir elevations for the Draft EIS analysis was appropriate given that modeling had to begin approximately 2 years before the start of the new guidelines, and there was significant uncertainty about hydrology in 2025 and 2026. The initial conditions were taken from the best available mid-term projections at that time. Because the Low initial conditions used in the Draft EIS are reasonably representative of where the system will be starting in 2027, the Final EIS shows impacts based only on the Low initial conditions. See **Appendix G**, CRSS Initial Conditions, for a comparison of current projections and the Low initial conditions.

With respect to hydrology, the choice to use Decision Making under Deep Uncertainty (DMDU) as the analysis framework necessitates incorporating a wide range of conditions, and the set of hydrologic model inputs is appropriate for this purpose. The DMDU framework evaluates how each alternative performs across a wide range of plausible future hydrologic and operational conditions. Rather than relying on a single predicted future, this approach provides insight into how an alternative performs across a broad range of future conditions. These methods and choices are well documented in **Appendix E**, DMDU Overview and Approach and **Appendix F**, Approach to Hydrologic Uncertainty.

In response to comments regarding climate change, Reclamation has been involved in scientific studies related to climate projections over the past several decades. Those efforts are reflected in some of the hydrologic inputs used in this analysis, and the DMDU framework evaluates the alternatives across a wide range of hydrologic uncertainty, including uncertainty associated with climate trends.

For discussion about Upper Basin demands, see **Section R.3.4**.

With respect to Lower Basin demands and system losses, including tributary use, Reclamation recently completed an effort to recalculate and release Lower Basin CU&L data through 2024, published in December 2025. Reclamation is also developing updated natural flow estimates, though these data were available in time for incorporation into this analysis. Additional analysis of Lower Basin evaporation and system losses, however, are outside the scope of this EIS. Methodologies for

developing these datasets are presented in “Estimates of Evapotranspiration and Evaporation Along the Lower Colorado River,” published by Reclamation in early 2024; that report does not, however, make recommendations for implementing or accounting for system losses from the Lower Colorado River mainstem. For a discussion of modeling assumptions related to Lower Basin demand, including build-out assumptions, see **Section R.3.7.5, Quantification and Modeling of Lower Basin Water Demands**.

With respect to comments regarding “gap water,” **Chapter 2** and **Appendix S, Additional Description of Alternatives**, provide a clear description of gap water, and detailed CRSS modeling assumptions are provided in **Appendix A, CRSS Model Documentation**. Additionally, **Appendix D, Sensitivity Analysis - Effects of Natural Flow Percentage Used for the Supply Driven Alternative**, provides a quantification of gap water.

In response to comments regarding the clarity of the evaporation assessment for the storage and delivery of conserved system and non-system water mechanism, the evaporation assumptions vary by alternative: some alternatives apply an annual percentage, while others are based on the actual evaporation of the reservoir in which the water is stored. These assumptions are described in detail in **Appendix B, Modeling Assumptions: Lake Powell and Lake Mead Storage and Delivery of Conserved Water**.

R.3.11 Alternatives Development/Range of Alternatives

R.3.11.1. Range of Alternatives

Summary

Commenters state that the Draft EIS does not include a reasonable range of technically and economically feasible alternatives. Certain commenters note deficiencies in the treatment of Compact compliance, citing an over-reliance on Lower Basin reductions and a lack of clearly defined Upper Basin conservation and operational commitments. Commenters state that alternatives should disclose connected actions and operational details sufficient for meaningful public and decision-maker review.

Additional commenters assert that the range of alternatives is inadequate because certain submitted proposals or concepts (such as those advanced by the Upper Division States, Lower Division States, Gila River Indian Community, and Colorado River Indian Tribes) were not fully analyzed as standalone alternatives. Other commenters expressed the opposite view, that the Draft EIS considers too many concepts or includes operational elements they believe are outside the appropriate scope of this NEPA review, are infeasible, rely on speculative assumptions about actions outside Reclamation’s control, are not in compliance with the Law of the River, or are otherwise beyond existing authority.

Response

Reclamation developed and screened alternatives in accordance with NEPA, which requires agencies to evaluate a reasonable range of alternatives that meet the Purpose and Need for the Proposed Federal Action. This Final EIS evaluates the environmental effects of six alternatives, including the

No Action Alternative, as required by NEPA, and five action alternatives. As described in **Chapter 2** and **Appendix S**, Additional Description of Alternatives, alternatives and operational elements were developed through multi-year engagement and then screened based on alignment with the Purpose and Need, technical and economic feasibility, a reasonable expectation that necessary authorities could be pursued, and the ability to meaningfully analyze environmental effects of the alternatives within the Final EIS.

In response to comments requesting a broader range of alternatives, Reclamation notes that numerous concepts, including proposals submitted by stakeholders and the Basin States, were considered during the alternatives development process. As described in **Chapter 2** and **Appendix S**, these concepts and proposals informed the development and screening of the alternatives carried forward for detailed analysis. An EIS is not required to analyze every alternative proposed during scoping or public review, but rather to rigorously explore and evaluate a reasonable range of alternatives that are feasible and that meet the Purpose and Need for the proposed action. The fact that a particular proposal was not advanced as a standalone alternative does not mean it was disregarded. Many elements of submitted proposals were incorporated into the development, refinement, or comparative analysis of the alternatives evaluated in the Final EIS.

With respect to the Upper Division States' and Lower Division States' proposals, Reclamation considered those proposals during alternatives development, considered the respective revisions submitted in winter 2024, and evaluated whether they provided an appropriate basis for comprehensive and coordinated operations of Lake Powell and Lake Mead consistent with the Purpose and Need. Reclamation worked extensively with both the Upper Division States and Lower Division States to not only understand and gather information, but also to model and perform detailed analysis of their respective proposals. As described in the Final EIS (see **Section 2.1**), the Basin State proposals, as submitted, were not included as standalone alternatives because they did not include appropriate bases for the comprehensive and coordinated operations of Lake Powell and Lake Mead.

Reclamation incorporated elements of the submitted proposals, along with concepts generated during Reclamation's engagement with the Basin States throughout 2025, to inform the development and refinement of the action alternatives that were carried forward for analysis. After continued work with all seven states throughout the spring and summer of 2025, the concept that became the Supply Driven Alternative was actively being considered by all states but had not achieved full agreement. Because there was no consensus-based alternative, the Draft EIS attempted to capture the state of discussions through inclusion of the Supply Driven Alternative but did not identify a preferred alternative. After publication of the Draft EIS, coordination with the States continued although the discussion had moved away from the concept of the Supply Driven Alternative.

In addition to the individual state comments submitted on the Draft EIS that contained proposed operational strategies, the Upper Division States and Lower Division States submitted additional proposals in May 2026 after the publication of the Draft EIS. The proposal submitted by the Lower Division States described a 2-year set of operating guidelines through 2028 as a bridge to allow future opportunity to reach a consensus-based long-term solution. The Preferred Alternative

identified in the Final EIS incorporates concepts from the States' proposals and leaves open the opportunity for Basin entities to subsequently arrive at a consensus-based path forward. Should no consensus emerge, the Preferred Alternative ensures that the Secretary will have the flexibility to make necessary operational decisions.

R.3.11.2. No Action Alternative

Summary

Commenters disagreed with the characterization of the No Action Alternative, stating that it did not represent a baseline for comparison and a return to implementation of the LROC under a pre-2007 Interim Guidelines framework. For example, commenters stated that the No Action improperly limits the Secretary's authorities to take actions to protect infrastructure and incorrectly limits Lower Basin shortages to 600 thousand acre-feet, the maximum Lower Basin shortage from the 2007 Interim Guidelines. Commenters expressed concern that limiting shortage to that amount would fail to protect infrastructure at Glen Canyon Dam. Commenters also stated that the No Action Alternative represented a misapplication of the LROC because it improperly sets the annual release to a fixed volume of 8.23 maf. Finally, commenters state that the No Action Alternative fails to meet the Purpose and Need.

Response

As described in the Final EIS (**Appendix S**, Additional Description of Alternatives), Reclamation based the No Action Alternative on the operating guidance that was in place before the adoption of the 2007 Interim Guidelines ROD to provide a reasonable representation of how the system would continue to operate if no additional operating guidelines were adopted. Before the 2007 Interim Guidelines were in place, the basis for operations was the narrative provisions of the LROC, under which the Secretary made a number of determinations at the beginning of each operating year as described in the Annual Operating Plan for Colorado River Reservoirs, including the water supply available to users in the Lower Basin and the annual release from Lake Powell. The LROC does not include specific guidelines for such determinations, so the outcome of the annual determination in any particular year in the future could not be precisely known. However, a reasonable representation of future conditions under the No Action Alternative is needed for comparison to each action alternative. The modeling assumptions used for this representation are consistent with assumptions used in previous environmental compliance documents, most recently the 2007 Interim Guidelines, with appropriate refinements. The assumptions used in the No Action Alternative are not intended to limit or predetermine any future decision by the Department.

As the Final EIS explains in **Appendix S** and **Section 3.2.3**, the No Action Alternative appropriately describes an operational framework that reverts to implementing LROC similar to what occurred before the 2007 Interim Guidelines. The expiration of current domestic and international implementing agreements means that the No Action Alternative represents a change in operations. As a result, the No Action Alternative does not serve as an appropriate baseline to compare impacts. Therefore, a Continued Current Strategies Comparative Baseline scenario is provided to assess the impacts if operations were to continue under the current direction and strategies. While the Continued Current Strategies Comparative Baseline is not an action alternative,

it is a contemporary set of operations that stakeholders are familiar with that can be used to comparatively evaluate the performance of the alternatives (including the No Action Alternative).

Regarding Lower Basin shortages, as described in **Appendix S** of the Final EIS, in accordance with the Consolidated Decree and the LROC, the Secretary makes a determination each year as to whether the consumptive use requirements of mainstream users in the Lower Division States will be met under a Normal, Surplus, or Shortage Condition. The LROC specify that the Secretary will consider all relevant factors in making a shortage determination and list some of the factors to be considered. However, there is no specific LROC guidance as to exactly when, how, or to whom reductions in deliveries would be made under the No Action Alternative in the absence of set operating guidelines. Therefore, it is impossible to know exactly how the Secretary might make a shortage determination from year to year in the future. To provide a representation of how decisions may be made under the No Action Alternative for the purposes of analysis, the elevations and volumes adopted in that ROD are assumed for this alternative. The Final EIS considers a range of Lower Basin Shortage maximums to illustrate impacts and tradeoffs associated with each. Regardless of the alternative considered, 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 narrative provisions of LROC are used to make determinations with respect to storage reservoirs in the Basin under the No Action Alternative. Annual releases from Lake Powell that vary from 8.23 maf are analyzed in other action alternatives in the Final EIS. For more information on LROC Implementation, see **Section R.3.5**.

The No Action Alternative is not required to meet the Purpose and Need for the proposed action. It is included as a baseline for comparison against the effects of the action alternatives.

R.3.11.3. Preferred Alternative

Summary

Commenters asserted that the absence of a preferred alternative in the draft EIS limited meaningful opportunity for public comment.

Response

The Draft EIS is designed to present and evaluate a reasonable range of alternatives with sufficient detail to support informed decision-making and allow for meaningful comparison of effects consistent with Purpose and Need. NEPA does not require identification of a preferred alternative in a Draft EIS, and an agency may choose to identify, develop, or refine a preferred alternative in the Final EIS. The Representative Preferred Alternative for this Proposed Federal Action was developed following the release of the Draft EIS, and is further described in **Chapter 2, Description of Alternatives**.

Several commenters requested additional detail regarding authorities, Compact compliance assumptions, and the treatment of actions outside Reclamation's control. Reclamation's evaluation

of alternatives is conducted within the context of the Law of the River and applicable authorities, and the EIS does not resolve disputed legal interpretations. For comment topics focused on authority or legal interpretation, see the Theme Summary/Response for **Section R.3.1**, Secretarial Authorities and **Section R.3.18**, Policy and Governance. For comment topics focused on Compact compliance concepts or differing Compact interpretations, see **Section R.3.2**, 1922 Colorado River Compact Compliance.

For comment topics requesting additional disclosure of connected actions, third-party actions, or operational details outside the scope of this EIS, see **Section R.3.21**, Connected Actions and Cumulative Effects and **Section R.3.19**, Scope. For comment topics requesting detailed analysis of specific concepts that were screened out, see **Section R.3.13**, Alternatives Considered but Eliminated. For comment topics seeking additional specificity regarding Upper Basin conservation assumptions and feasibility, see **Section R.3.4**, Upper Basin Demands, Shortage, and Conservation. No Action sub-theme: Cross-reference to LROC and infrastructure protection sections. Under NEPA, an agency is required to describe a “no action” alternative in an EIS. Consistent with the No Action Alternative analyzed in the 2007 Interim Guidelines Final EIS, the No Action Alternative is based upon operating guidance that was in place before the adoption of the 2007 Interim Guidelines ROD to provide a reasonable representation of how the system would continue to operate within existing authorities if no additional operating guidelines were adopted and absent additional agreements. It represents a return to operations preceding development of the 2007 Interim Guidelines and is necessary as a comparison for each action alternative. The No Action Alternative is not required to meet Purpose and Need.

R.3.12 Coordinated Operations of Lake Powell and Lake Mead

Theme Summary

Many commenters expressed views on how to prioritize resources and which criteria to use when determining coordinated operations, particularly for operations at Lake Powell. Commenters identified specific Lake Powell elevations that should be maintained, such as 3,570 feet for the purposes of protecting native fish in the Grand Canyon, and 3,525 feet to preserve the ability to perform high-low experiments (HFEs). Others suggested that prioritizing reservoir storage for water security or recreation purposes was important, or that ensuring reservoirs could continue to generate hydropower was critical. Some highlighted the importance of basing operations on observed inflows to Lake Powell, and to allow releases to reflect hydrologic variability in a more natural way.

Response

Reclamation recognizes that the Colorado River supports many important and valuable resources, and that stakeholders throughout the Basin prioritize these resources differently. During the alternatives development process, Reclamation ensured that the action alternatives in the Draft EIS reflected a wide range of Lake Powell operations that achieved different balances of performance across resources. The Enhanced Coordination and Maximum Operational Flexibility Alternatives were designed specifically to account for different resource values. Additionally, the Draft EIS alternatives capture a wide range of operating criteria, including the explicit use of hydrology in determining releases. Finally, the Draft EIS analysis describes how these resources perform and by looking at a wide range of resources, the tradeoffs across priorities are reflected.

R.3.13 Alternatives Considered but Eliminated

Theme Summary

Some commenters requested a detailed analysis of alternatives that were identified in the Draft EIS as considered but eliminated, including structural modifications to Glen Canyon Dam, such as a river-level bypass and improvements to outlet works. Requests were made to analyze one-dam alternatives that would prioritize the preservation and operation of a single mainstream reservoir—either Hoover Dam/Lake Mead or Glen Canyon Dam/Lake Powell—over the other. The majority of these commenters supported a ‘Fill Mead First’ alternative, including proposals to bypass or decommission Glen Canyon Dam. Other requests questioned the exclusion of ecosystem-first alternatives, and recreation-focused plans from analysis. Some comments expressed general agreement or disagreement with the elimination of an alternative from detailed analysis.

In some cases, commenters took issue with specific aspects of the rationale for not analyzing the alternative in detail. For example, some commenters questioned how the Ecosystem Alternative would not fully resolve the operational and legal requirements for managing Colorado River water and noted that, while an ecosystem-based alternative would include cuts to water allocations and implementation of water conservation measures, alternatives considered in detail also involve these elements. Other commenters stated that there were more flexibilities within the concept of a “Fill Mead First” Alternative that could allow it to be implemented in a manner consistent with the Law of the River.

Theme Response

Consistent with NEPA requirements and as described in **Chapter 2** and **Appendix S**, Additional Description of Alternatives, this Final EIS focuses detailed analysis on a reasonable range of alternatives. A reasonable range of alternatives under NEPA provides decision makers and the public with a meaningful basis to compare environmental impacts and make informed choices. NEPA does not require that the scope of alternatives included be exhaustive, and agencies do not need to consider alternatives that are infeasible, ineffective, or otherwise inconsistent with the objectives of the proposed federal action. Alternatives, operational concepts, or components of alternatives that were considered but not carried forward for detailed analysis are documented in **Appendix S** of the Final EIS, with explanations for the bases for their elimination. This response further clarifies the rationale for eliminating specific alternatives –Fill Mead First approach, ecosystem-first alternatives, and recreation-focused plans— from detailed analysis.

An ecosystem-first alternative generally refers to a management framework that prioritizes the long-term ecological function of the Colorado River system over congressionally authorized project purposes. An ecosystem-first operational framework would limit operational flexibility or require extensive changes to Colorado River operations and contracts and would reduce water supply for users based on prioritizing ecological thresholds and constraints. Thus, while specific ecosystem considerations and objectives were incorporated into the EIS, the EIS does not analyze a stand-alone ecosystem-first alternative.

A ‘Fill Mead First’ alternative proposes an operational strategy that prioritizes Lake Mead as the primary water storage facility on the mainstream Colorado River and subordinates Lake Powell as a

secondary water storage facility operationally dependent upon storage conditions at Lake Mead. This alternative was not included in the Final EIS because it would not meet the Purpose and Need of the proposed federal action, lacks fundamental compliance with the Law of the River, and would require extensive changes to Colorado River operations and contracts. A Fill Mead First approach likely would need to involve a novel inter-basin water storage exchange or conservation pool. It would alter the purpose of the guidelines for coordinated operations of both Lake Powell and Lake Mead, under the existing statutory and legal structure, without Congressional authorization. The purpose and need of this EIS supports the development of operational guidelines for the management of the existing reservoirs, which includes a fundamental assumption of the continued existence of and congressionally authorized purposes of Lake Powell and Lake Mead. This EIS analyzes alternatives within operational objectives designed to protect critical infrastructure, maintain water delivery reliability, preserve operational capability, and maintain system flexibility. A one-reservoir alternative, such as the Fill Mead First approach, would require significant legal, engineering, financial, and congressional action. The Fill Mead First alternative and other alternatives regarding decommissioning Glen Canyon Dam were rejected in the 1995 EIS on Glen Canyon Dam operations and in LTEMP for similar reasons.

Regarding modifications to Glen Canyon Dam infrastructure, specific infrastructure modifications are not currently contemplated as components of individual alternatives within the EIS, since pursuing them would be outside the scope of adopting specific operational guidelines, and operational guidelines must be adopted as a result of this process whether or not any infrastructure modifications are pursued in a separate action. See theme response **Section R.3.6**, Glen Canyon Dam and Hoover Dam Infrastructure, for additional information.

R.3.14 Sustainable, Reliable, and Adaptive Management

Theme Summary

Commenters advocate a proactive, science-based management framework that internalizes long-term aridification, employs realistic supply projections, and prioritizes demand reduction and conservation over perpetuating unsustainable allocations. Commenters call for transparent modeling and reporting and integrated ecological stewardship. Many commenters asked for the inclusion of riparian restoration, invasive species control, and sediment and temperature management. Requests were made for flexible tools that scale to actual hydrologic conditions and are developed within operational decision-making, rather than deferred to reactive compliance documents. Suggested instruments include enforceable efficiency standards, incentives and mandates for agricultural modernization and crop substitution, expanded off-stream storage and recharge, transparent accounting of avoided spills, and clearly specified ecological thresholds (e.g., Powell elevation targets for temperature control; minimum Grand Canyon flows; monthly release limits and HFE frequency contingent on sediment).

Response

Reclamation considered sustainable, reliable, and adaptive management while developing the Draft EIS and Final EIS. Many of the concepts that commenters requested have been incorporated into the Final EIS, including proactive and science-based management. However, some concepts raised by commenters were outside the scope of this EIS or were in the realm of state and local

jurisdictional decisions, including implementation of incentives and mandates for specific agricultural practices and development of expanded off-stream storage projects. Other requests will be addressed, where appropriate, through subsequent NEPA and Endangered Species Act (ESA) efforts or through programmatic and operational planning efforts beyond this EIS.

R.3.15 Mitigation

Theme Summary

Commenters asserted that the Draft EIS mitigation discussion is inadequate under NEPA/Council on Environmental Quality standards and seek integrated, enforceable, and funded mitigation tied to each alternative, with monitoring, adaptive triggers, and long-term management. Proposed measures include direct assistance and replacement supplies to tribes where deliveries are reduced; transactional flexibility and accounting for conserved water; compensation frameworks linked to modeled damages and improved conveyance infrastructure. Biological mitigation requests emphasize thresholds for critical habitat, native fish passage protection, non-native control, HFE regimes to rebuild habitat, and expanded conservation areas. Commenters suggested proactive coordination with stakeholders, including the National Park Service, to evaluate and implement adaptive management and infrastructure solutions to mitigate potential adverse effects on water-dependent recreational activities. Socioeconomic mitigation measures include workforce transition programs, compensated conservation that maintains agricultural viability, and targeted responses for the Salton Sea (dust suppression, habitat restoration, human health responses, and infrastructure investments).

Response

The Draft EIS complies with current Department regulations and guidance for NEPA compliance, including the DOI NEPA Handbook (516 DM 1, February 2026). The Handbook explains that although “NEPA requires bureaus to consider reasonable mitigation measures, it does not require bureaus to evaluate or select any specific form of mitigation.” NEPA does not independently confer authority on agencies to require, fund, or enforce mitigation measures absent separate substantive authority.

The proposed federal action and alternatives include review of the environmental effects of mitigation measures, and such mitigation approaches are described at a programmatic level and are commensurate with the planning-level nature of this EIS. Compliance under other laws, including the ESA, may provide additional specific mitigation measures. Reclamation would continue to coordinate with the appropriate stakeholders during the implementation of a selected alternative. Historically, this coordination provides for additional tools to minimize impacts.

R.3.16 Decision Process

R.3.16.1. Preferred Alternative Selection

Summary

Commenters requested transparent decision criteria for selecting a Preferred Alternative, including explicit articulation of the Secretary’s vision and clearer grounding in current hydrologic realities.

Several commenters argued that a Preferred Alternative should have been identified for public review in a revised or supplemental draft prior to issuance of the Final EIS.

Response

NEPA does not require a preferred alternative to be identified in the Draft EIS. The alternatives analyzed in this Final EIS include a broad range of operational elements incorporating over 4 years of input provided by stakeholders and the public and received through consultations with the Basin States and Basin Tribes, the alternatives development process is described further in **Chapter 2**. In the absence of a long-term consensus-based approach, Reclamation has developed a Preferred Alternative that consists of a decision framework to develop operating guidelines for Lake Powell and Lake Mead for operating years 2027 through 2036. This framework provides near-term certainty and predictability for Lake Powell and Lake Mead operations, establishes a transparent process for making operational decisions in the absence of long-term consensus, and allows for incorporation of future consensus recommendations while preserving the flexibility to respond to changing hydrologic conditions. The process and timeframes are explicitly designed to facilitate consideration of and response to hydrologic conditions. Should no consensus emerge, the Preferred Alternative ensures that the Secretary will have the flexibility to make necessary operational decisions.

R.3.16.2. Implementation of Annual Decision-making

Summary

Commenters requested improved stakeholder inclusion in annual operational decision-making. Specific suggestions for this include forming a basin-wide adaptive management advisory body with transparent data and annual criteria and sustaining ongoing consultation throughout implementation and adjustments over time.

Response

The Department is tasked with determining annual operations in consultation with the States. Additional consultations and processes, including engagement with tribes, are important for achieving a decision. However, it is not necessary to fully describe and analyze specific alternatives for annual operational decision-making as part of this NEPA process. The ROD will incorporate a consultation and outreach process to inform future post-2026 operational decisions.

R.3.17 Purpose and Need

Theme Summary

Commenters argue that the analyzed alternatives do not fully meet the stated Purpose and Need under dry and critically dry conditions and that performance thresholds are not coherently linked to stated objectives. For example, the Draft EIS identifies avoidance of Lake Powell dead pool-related reductions as a performance indicator for evaluating robustness, yet the analysis shows that none of the alternatives meet this criterion. Some commenters requested a broader, systemwide Purpose and Need that explicitly addresses structural deficit and Compact compliance, integrates ecological mandates and statutory responsibilities (Grand Canyon Protection Act of 1992 [GCPA], ESA, National Park Service Organic Act), and reflects persistent aridification rather than treating conditions as mere variability.

Theme Response

Under NEPA, a purpose and need statement is required to explain the basis for the federal action by identifying why the action is being considered and what the agency intends to accomplish.

Chapter 1 outlines the Purpose and Need for this Proposed Federal Action, as set forth in the *Federal Register* notice published on October 20, 2023 ([88 Federal Register 72535](#)). The purpose and need for this proposed federal action provides a framework for considering varied operational and management strategies within a reasonable range of alternatives by establishing management objectives, operational needs, and applicable legal or regulatory considerations. It is sufficiently broad to allow consideration of a reasonable range of alternatives, but not so broad that it becomes unbounded or speculative and defines a decision space that allows multiple implementable operational alternatives while remaining consistent with authority and physical system limits.

The scope of the federal action is the development 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. All the analyzed alternatives provide a wide range of operations that meet the purpose and need for the scope of this action, while highlighting the trade-offs between them in meeting the specific objectives of the purpose and need. As shown by the analysis, during dry and critically dry conditions, performance objectives may not be met, and the degree of impacts could be significant to users and resources. This is the inherent challenge with a finite resource in great demand. At this point, no other alternatives have been brought forward that would result in better performance and fewer impacts.

R.3.18 Policy and Governance**Theme Summary**

Commenters emphasized adherence to the Law of the River and related authorities (or various interpretations thereof). Specific components mentioned by commenters included Articles III(c)–(d) of the 1922 Compact, the CRSP Act, CRBPA, the Consolidated Decree, LROC/602(a), and binational treaty obligations. Commenters requested Reclamation explain any perceived departures from their preferred interpretations, incorporate Compact compliance as an operational priority, and reconcile operations with obligations under GCPA and ESA. Additional comment themes include limitations regarding interstate and interbasin marketing, maintenance of hydropower production for authorized purposes while recognizing its subordination to agricultural and domestic uses, and attention to national policy linkages (e.g., critical minerals, energy, and security).

Response

The Secretary intends to consider, adopt, and implement the proposed federal action consistent with the Law of the River. The alternatives in this Final EIS are designed to cover a wide range of potential outcomes with respect to post-2026 operations; accordingly, they incorporate components that are within existing authorities along with components that would require new authorities and/or new agreements among Basin water users to fully implement, see **Section 2.3**. The EIS does not establish new legal interpretations, resolve contested questions about the 1922 Compact or other authorities, or modify existing governance frameworks. Rather, it evaluates the environmental consequences of potential federal actions across a range of alternatives, see further discussion in theme responses **Sections R.3.1** and **R.3.2**.

R.3.19 Scope

Theme Summary

Commenters indicated differing views on whether the analysis should be limited to Lake Powell and Lake Mead operations, or to expand the geographic scope, both upstream to include the CRSP Upper Initial Units and downstream to include Mexico. Other commenters asked for analysis of more localized impacts related to specific water users, water districts (e.g., Southern Nevada Water Authority, CAP contractors, and the Salton Sea). Comments also focused on the analysis scope, requesting additional analysis on their locally/privately owned non-Federal water delivery infrastructure, water leases, and quantification of effects on other water supplies, such as groundwater. Many point to analytical inconsistencies in which upstream releases or conservation are assumed but upstream impacts are not analyzed. Requests span analyzing Upper Basin shortages and conservation, incorporating transboundary effects under Executive Order 12114, and clarifying the geographic boundary relative to Lake Powell's full pool. Other comments cover a wide variety of topics that are not within the scope of this EIS, such as impacts on low-income and minority populations, impacts on water users who lease water from water right holders, impacts from sub-annual flows for ecological benefits, impacts related to infrastructure upgrades or modifications.

Response

Section 3.2 of the Draft EIS (Analysis Methods) includes a detailed discussion on how Reclamation defined the geographic, temporal, and analysis scope. The scope is expanded for certain resource analyses based on those particular resources, as described in the respective resource analysis sections. For many resources, expanding the scope of analysis introduces uncertainty into impact analysis because impacts and causal relationships will become more speculative, non-federal decision points are introduced, and Reclamation's authorities become more limited. These factors create a level of uncertainty that makes it impractical to analyze certain expanded resource areas. Reclamation clarified the text in **Section 3.2** of the Final EIS to better define the default geographic scope for analysis; specific resource topics (e.g., socioeconomic impacts) describe more expanded analysis scopes as applicable.

Proposed operations at the CRSP Upper Initial Units specifically contemplated in the alternatives informed the hydrological modeling in the Draft EIS. These operations are within the scope of each unit's existing RODs, and as such, the associated impacts are disclosed in the associated EISs. Specific conservation activities that may be undertaken in the Upper Basin are unknown at this time and would not necessarily require federal operational decision making. Any federal operational decisions associated with these conservation activities would undergo additional environmental compliance.

Deliveries to Mexico are determined by Treaty and international agreements. Modeling assumptions with respect to water deliveries to Mexico were necessary to analyze potential impacts on hydrologic and other environmental resources. Since Reclamation does not control the use and distribution of water in Mexico, direct impact analysis on specific resources would be speculative.

The Salton Sea is a terminal lake in Riverside and Imperial Counties, California. Lake levels are influenced by runoff from the surrounding Imperial Valley and Coachella Valley watersheds, as well

as agricultural drainage from the Imperial Irrigation District and Coachella Valley Water District. Reclamation does not manage or control the end use of water after the point of delivery. As such, Reclamation has no management authority over the distribution of end use or allocation by these water districts and individual users, including user decisions to participate in conservation programs. The State of California oversees management of the Salton Sea, and Reclamation has no management or enforcement authority over inputs to the Sea.

As a general matter, groundwater in Arizona is governed by state law, in particular the Arizona Groundwater Code, established by the Arizona Groundwater Management Act of 1980 as amended. See Arizona Revised Statutes (A.R.S.) Title 45, Chapter 2. The Arizona Groundwater Code is a “framework for the comprehensive management and regulation of the withdrawal, transportation, use, conservation and conveyance of rights to use the groundwater in this state.” A.R.S. § 45-401(B). A state agency, the Arizona Department of Water Resources, has “general control and supervision” of groundwater in the state as provided by A.R.S. Title 45. See also 43 United States Code (U.S.C.) § 617q. Regulation of state groundwater thus is generally outside Reclamation’s jurisdiction, with limited exceptions based in federal law. For example, exceptions may include federal actions under federal trust responsibilities and statutes related to Indian tribes, certain releases of hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. §§9601 et seq.), and in relation to the Colorado River, the subflow zone (e.g., A.R.S. § 45-596.01) and specific limitations related to CAP subcontracts as provided in the CRBPA, 43 U.S.C. 1524. Therefore, analysis related to any decisions made by Arizona water users to change or supplement water sources due to federal actions would be speculative. The purpose of this EIS is to analyze and disclose the reasonably foreseeable effects from the proposed action and alternatives within the defined area of analysis, and items outside this scope are therefore not included in the analysis. See **Section 1.5** of the Final EIS for additional details on the geographic scope affected by the proposed federal action. The Final EIS complies with current Executive Orders and Department regulations and guidance for NEPA compliance, including the DOI NEPA Handbook (516 DM 1, February 2026). The Handbook supplements the Council on Environmental Quality regulations (40 CFR 1500–1508) and Department regulations (43 CFR Part 46). The Draft EIS also complies with current Executive Orders related to NEPA analysis. For example, pursuant to Executive Order 14154, Unleashing American Energy (January 20, 2025), and the Presidential Memorandum entitled Ending Illegal Discrimination and Restoring Merit-Based Opportunity (January 21, 2025).

R.3.20 Data Sources

Theme Summary

Commenters requested that Reclamation use updated and transparent data sources, including the incorporation of updated capacity surveys, CU&L datasets (including Upper Basin and Lower Basin CU&L and evaporation), published materials related to drought science, and independent peer review. Commenters urged transparency around Lower Basin uses and losses and asked that model assumptions be refined to reflect current storage conditions, depletion schedules, and hydrologic conditions.

Response

Reclamation incorporated the best available science and all necessary data for the development of the Final EIS. Data sources, assumptions, and methodologies are documented in the EIS and supporting appendices to support transparency and reproducibility.

With respect to updated capacity surveys and Upper CU&L and evaporation data, the selection of data sources for the CRSS model had to occur 2 and 3 years, respectively, before EIS modeling began. At that time, these data sources represented the best available datasets. Lake Powell modeling relied on the 2017 Lake Powell Stage-Area-Capacity survey, which remains the most recent survey published and continues to represent the best available science. Upper Basin CU&L and evaporation were based on Upper Colorado River System CU&L data released in February 2022, covering the 1971-2020 period and including upper system reservoir evaporation.

These CU&L data are essential inputs for two critical datasets used in CRSS for the EIS modeling. The natural flow data and the UCRC depletion demand schedule. The 1906-2020 natural flow data was released in December 2022. The UCRC depletion schedule followed a more complicated development timeline.

The UCRC first released a supply-limited depletion schedule in June 2017, providing decadal depletion demand projection by state and major consumptive use sectors. Working with the UCRC and the Upper Division States, Reclamation translated these decadal projections into monthly, CRSS reach-scale inputs in November 2020. This supply-limited schedule pre-shorts demands in high Upper Basin tributaries that historically receive less than a full water supply, before inputting these schedules in CRSS.

In August 2021, the State of Colorado asked Reclamation to further refine and improve CRSS. One enhancement enabled the model to use a full-supply (rather than supply-limited) depletion demand schedule. In March 2023, Reclamation released CRSS version 6, which included the ability to short high-tributary water users dynamically during a model run. The UCRC then produced and published an updated 2016 depletion demand schedule compatible with CRSS version 6 in June 2022.

Reclamation released updated 1971-2023 Upper Basin CU&L data in June 2024. This update incorporated methodological changes to irrigated agriculture CU estimates, shifting CU among the Upper Division States. These shifts require development of a new UCRC depletion schedule when time allows. However, because EIS modeling commenced in November 2024, there was not sufficient time for the Upper Division States, the UCRC, and Reclamation to develop a second updated depletion demand schedule for CRSS version 6. Under typical conditions, this process takes about one year.

Given these modeling and timing constraints, Reclamation used the best available Upper Basin CU&L data for the EIS modeling.

With respect to published materials related to drought science, see **Section 5.3.10** in response to hydrology choice.

With respect to independent peer review in accordance with Executive Order 14303—Restoring Gold Standard Science (May 23, 2025) and the U.S. Department of the Interior Information Quality Guidelines Pursuant to Section 515 of the Treasury and General Government Appropriations Action for Fiscal Year 2021, Reclamation implemented a peer review process for the EIS. All models used for analysis went through a peer review process by the responsible agency. Reclamation conducted a peer review of the CRSS hydrological model, and the EIS went through a two-phase review process: (1) cooperating agency peer review of the preliminary Draft EIS and (2) an independent peer review of the Draft EIS. Results from the former were incorporated in the Draft EIS, and the results from the latter are included in the Final EIS. Peer review plans and reports for Reclamation generated products are available at Reclamation’s Quality of Information Peer Review [website](#).

For discussions about Lower Basin tributary CU&L and evaporation, see **Section R.3.7**.

For discussions about initial and hydrologic conditions see **Section R.3.10**.

R.3.21 Connected Actions and Cumulative Effects

Theme Summary

Commenters requested that alternatives disclose connected actions and operational details sufficient to support meaningful public and decision-maker review. Commenters asserted that the cumulative effects analysis is overly qualitative and incomplete, and requested expanded treatment of connected and indirect effects within Reclamation’s purview. Specific requests included more comprehensive socioeconomic and public-health impacts, groundwater resources, and associated impacts such as depletion, subsidence, and water quality. Commenters also asked Reclamation to address how other foreseeable actions, such as urban growth, land use changes, and water-management projects, could contribute to cumulative effects.

Response

The EIS considers connected actions consistent with NEPA and regulations, focusing on impacts that are reasonably foreseeable from the proposed action and alternatives within the defined area of analysis and within Reclamation’s authority.

As described in **Section 3.14.1.2**, cumulative effects analysis such as the potential socioeconomic consequences or impacts to local groundwater supplies due to shortages occurring in the municipal and industrial sector were qualitatively assessed since it was not known to what degree a specific economic sector considered a municipal and industrial use would be affected. The effects on individual cities or communities are indeterminate for various reasons. Each city or community has a different mix of water supplies, and in most cases, has formulated a shortage or drought response plan that is specific to their respective community. Also, individual response plans typically include varying combinations of demand-side and supply-side actions, and these differ by community. The use or acquisition of other water supplies and development and implementation of response plans would vary according to then-current state, tribal, and local laws, regulations, policies, or governing board or council actions, which are outside of Reclamation’s jurisdiction.

Further, Reclamation is not required to consider environmental effects, including ecological, aesthetic, historic, cultural, economic, social, local custom and cultural, and health effects, from other projects that (1) are separate in time or place from the project at hand, (2) fall outside an agency's regulatory authority, or (3) are carried out independently by third parties. Ultimately, “where an agency has no ability to prevent a certain effect due to its limited statutory authority over the relevant actions, the agency cannot be considered a legally relevant ‘cause’ of the effect.” (516 DM 1 - DOI NEPA Handbook 2026).

Additional information on connected actions and cumulative impacts on specific resources is provided in the resource themes below (**Sections R.3.26-R.3.41**).

R.3.22 Decision-Making under Deep Uncertainty and Approach to Analysis

Theme Summary

Commenters ask Reclamation to provide clearer explanations and figures for the DMDU analysis.

Commenters note that, in robustness analyses, alternatives do not meet important performance levels in 100 percent of hydrologic futures, and commenters ask if such results indicate none of the alternatives are robust.

Commenters ask Reclamation to focus on drier conditions and remove the mid and high initial condition scenarios.

Commenters ask Reclamation to attribute various performance outcomes to different operational components.

Response

We agree with commenters that the Draft EIS was insufficient in the description and interpretation of results. To address this, explanations have been improved for clarity throughout **Chapter 3** and the technical appendices. The vulnerability analysis figures have been updated with a new legend to aid interpretation, and the descriptions of the results have been improved.

Due to recent hydrologic conditions and reservoir storage, the analysis has been updated by removing the middle and high initial reservoir storage scenarios. The Final EIS considers only the low initial condition scenario.

Critically, Colorado River hydrology is highly variable year-to-year; the severity, frequency, duration, and sequencing of future hydrology is unknown; there is no consensus in the scientific or planning communities on how to characterize future hydrology probabilistically; and the types of hydrologic futures that are most relevant for evaluating critical system risks varies across alternatives, by resource, and often by individual analyses within a resource. Due to this deep uncertainty and high degree of inter-resource variation, a tailored ensemble of dry hydrology traces would be insufficient to analyze risks to all resources in this EIS.

The DMDU framework therefore analyzes a broad range of hydrologic conditions. The set of 400 hydrologic traces intentionally includes severely dry and wet traces (well outside the range of what

has been observed in the past) such that every alternative can fail critical performance goals (i.e., results in undesirable performance) in some percentage of futures. This is necessary so that, in vulnerability analysis, the expected hydrologic tipping point between preferred minimum performance and undesirable performance can be identified. Then, the vulnerability results, in combination with the reference hydrology, are used to interpret these results with the DMDU decision framework. Notably, descriptions of vulnerability results have been improved with concise conclusions about the alternatives. For example, this alternative [the Representative Preferred] is not likely to be vulnerable in the next 10 years because these conditions have not been observed and they occur in fewer than 10 percent of traces in the Drying with Variability Ensemble, which represents how hydrologic conditions may change in a warmer future' (see **Figure TA 4-3**). Please also refer to **Section 3.2.6, Appendix E, DMDU Overview and Approach, and Appendix F, Approach to Hydrologic Uncertainty**, for more information.

Regarding the presence of wet conditions in the 400 hydrologic traces, it is critical to understand the types of hydrology that result in undesirable performance that can occur under moderate or high reservoir conditions, such as cooler water temperatures that inhibit the growth and reproduction of native fish species (**TA 8, Biological Resources – Fish and Other Aquatic Species**), the availability of sediment for beach building in the Grand Canyon (**TA 5, Geomorphology and Sediment**), and use of the Glen Canyon Dam and Hoover Dam spillways (**TA 15, Dams and Electrical Power Resources**).

Simultaneously, Reclamation acknowledges that dry conditions pose significant risks. Vulnerability analysis identifies the specific dry conditions that are problematic for each alternative, then it compares those conditions to recent historical observations and plausible conditions under a drying future (the Drying with Variability reference hydrology). Further, results for the Representative Preferred alternative focus on Dry and Critically Dry conditions, and the 10-year tradeoff analysis for all alternatives in **Figure ES-5** focuses on conditions similar to and drier than recently observed. The Final EIS also frames the interpretation of results by explaining in **Chapter 3** that “Recent history combined with the increasing temperature trend, which is associated with lower streamflow, suggests that focusing more on the Average and Dry categories is warranted. However, Critically Dry conditions have been observed and could become more common”.

A piece-wise sensitivity analysis of all or most operational elements to support an extensive attribution analysis was not practical due to the number of alternatives, number and complexity of operational elements, and associated modeling requirements. However, throughout the analysis there are opportunities to consider the impacts of different elements. For example, the influence of conservation pools on reservoir levels is demonstrated in **TA 3-16** and **TA 3-17** and on shortages in **Figure TA 4-5**. A comparison of Lake Mead elevations in **TA 3-17** without conservation pools demonstrates the relative effectiveness of different maximum shortage volumes. **Figure TA 4-6** was also added in the Final EIS to show the impacts of conservation pools on dead pool-related delivery reductions.

R.3.23 Water with Mexico

Theme Summary

Commenters emphasized the need for formal binational engagement, a shared responsibility for 1944 Water Treaty deliveries between the Upper and Lower Division States, and the inclusion of Mexico's participation in water delivery reductions alongside water conservation opportunities. Commenters caution that water delivery reductions from yet undetermined agreements with Mexico pose analytical risk and request the integration of the impacts of salinity compliance (i.e., Minute 242) into modeling and decision criteria.

Response

The U.S. will conduct all necessary and appropriate discussions regarding the proposed federal action and implementation of the 1944 Water Treaty with Mexico through the IBWC in consultation with the Department of State. The modeled annual depletions in water deliveries to Mexico include modeling assumptions for reductions in water deliveries to Mexico and deferred deliveries that are available to Mexico for future delivery. Reclamation's modeling assumptions are not intended to constitute an interpretation or application of the 1944 Water Treaty or to represent current U.S. policy or a determination of future U.S. policy regarding deliveries to Mexico. Within this Final EIS analysis, the assumptions used for reductions in water deliveries to Mexico applied a fixed 16.67 percent of any total shortages applied to the Lower Basin, as well as any dead pool-related reductions. This assumption was applied uniformly across all alternatives, including the No Action Alternative. This percentage is computed by taking the ratio of Mexico's allotment to the sum of the Lower Basin U.S. apportionments and Mexico's allotment ($1.5 \text{ maf} / (7.5 \text{ maf} + 1.5 \text{ maf}) = 0.1667$ or 16.67 percent) and ensures that the water delivery reductions to Mexico are proportional to the shortages to the U.S. users in the Lower Basin.

Both the Draft and Final EIS include a comparative assessment of the long-term implications of the proposed alternatives on salinity levels reaching both the Imperial Dam and the Northerly International Boundary. Regarding compliance with the obligations of Minute 242 to the 1944 Water Treaty with Mexico, the modeling reflects one explicit assumption for the volume of pumped groundwater that can be used to meet Mexico's delivery while complying with Minute 242. If the volume of pumped groundwater that can be used to meet the delivery requirement has to be reduced, absent any binational agreements to address salinity impacts, then there might be additional impacts to Lake Mead. The actual impacts to Lake Mead would depend on complex operations below Imperial Dam, including the volume of pumped groundwater that could be used to meet Mexico's delivery while complying with Minute 242. A supplementary analysis was added to **Appendix N**, International Border Region of the Colorado River, to bound the potential impacts on Lake Mead, using two assumptions for the volume of pumped groundwater that can be used while operating to meet the salinity requirement specified in Minute 242.

R.3.24 Consultation: Biology/ESA

Theme Summary

Commenters seek ESA consultation concurrent with NEPA and completed before the ROD. They request that the Biological Assessments (BA) focus on dry and critically dry scenarios and that the

Biological Opinions (BO) address specific river reaches and operational effects. Commenters also request a clearer and side-by-side analysis of how alternatives may affect listed species under the ESA, critical habitat, and conservation areas, including those associated with the GCPA and Lower Colorado River Multi-Species Conservation Program (LCR MSCP). Additional requests include explicit linkage of elevation and release patterns to ecological effects, improving analysis of impacts on conservation areas and habitats, and identifying mitigation or adaptive management measures that could address potential impacts under varying hydrologic conditions.

Response

The EIS evaluates potential impacts on fish and wildlife, including ESA listed species and species covered by the LCR MSCP, using the best available scientific information and modeling approaches appropriate for basin-scale analysis under uncertain future hydrologic conditions. Species covered by the LCR MSCP are included as special status species in the EIS. The analysis uses a DMDU framework to evaluate potential effects across a range of hydrologic scenarios. Because future river flows, habitat conditions, and species responses are highly uncertain, the analysis relies on modeled system outcomes rather than predicting impacts for specific species at individual locations. The EIS acknowledges that resource tradeoffs may occur under different alternatives and scenarios.

The purpose of the EIS is to evaluate and compare environmental consequences for each alternative under NEPA. Providing side-by-side comparisons with the ESA, the LCR MSCP, or the GCPA is not an objective of this EIS, as those authorities operate under separate statutory and regulatory processes. The relative impacts of alternatives on ESA listed and other special status species and critical habitat is assessed in **TA 8**, Biological Resources – Fish and Other Aquatic Species, and summarized in **Figure TA 8-31** for aquatic species, **TA 9**, Vegetation Including Special Status Species, and **TA 10**, Terrestrial Wildlife Including Special Status Species for terrestrial habitat type, vegetation, and associated wildlife. ESA compliance, including evaluation of incidental take and conservation measures, occurs through the Section 7 consultation process that Reclamation is working through with the U.S. Fish and Wildlife Service (FWS). Reclamation coordinated with FWS and other agencies during the development of the EIS.

Reclamation has multiple existing ESA consultations aligned with the Upper Basin and Lower Basin programs. In the Lower Basin, ESA analyses and incidental take are covered and permitted through the LCR MSCP Section 7 BOs/Section 10 Habitat Conservation Plan. The most recent consultation between Reclamation and the FWS occurred in 2024. This consultation provides full analysis and coverage through January 31, 2028, for reductions in flow from Hoover Dam up to 3.0 maf. Reclamation and the LCR MSCP are currently developing a BA and a Habitat Conservation Plan permit amendment to ensure adequate analysis and coverage for the range of operations associated with the length of the EIS. As described in the document, the operational plan for Hoover Dam is not anticipated to exceed the flow coverage analyzed in the 2024 BO.

Additionally, a BA is being prepared to determine whether the Preferred Alternative may affect listed species in the Upper Basin (from full pool of Lake Powell to Pearce Ferry Rapid). This BA may include Conservation Measures that lessen the impact of the action on listed species. The FWS will then issue a BO determining whether the action is likely to jeopardize the continued existence of listed species or destroy or adversely modify critical habitat. If jeopardy or adverse modification is

determined, a Reasonable and Prudent Alternative will be developed with appropriate measures and Conservation Recommendations.

R.3.25 Consultation and Coordination

Theme Summary

Commenters recommended broadening consultation and coordination to include all affected governments and user groups, including tribes; engaging other federal departments to address national-scale consequences. Commenters also stated that there was inadequate consultation on the preferred alternative.

Response

Reclamation conducted extensive public outreach, held public scoping meetings and meetings on the public Draft EIS, and consulted formally and informally with representatives from the cooperating agencies, Basin States, tribes, non-governmental organizations, and other interested parties to obtain input on the EIS. Reclamation reached out to other federal agencies with jurisdiction or special expertise to participate as cooperating agencies in this process. Additional details on this outreach are provided in **Chapter 4**. Reclamation will continue to coordinate future operations with affected stakeholders as appropriate.

For additional information regarding consultation on the Preferred Alternative, see **Section R.3.16**, Decision Process.

R.3.26 Air Quality

Theme Summary

Commenters stated that the Draft EIS and supporting technical appendices do not sufficiently assess air quality impacts, particularly at the community scale. Commenters requested that the air quality analysis expand its geographic scope to include impacts on the Salton Sea, Coachella Valley, and Imperial Valley. They asked for additional analysis of increased dust emissions associated with fallowing, as well as a more robust discussion of greenhouse gas and climate change-related effects. Commenters were also interested in the risks associated with increased emissions from low reservoir elevations.

Response

Reclamation acknowledges that reductions in water deliveries under the alternatives could result in increases in fallowed agricultural acreage and that, under certain conditions, fallowed lands may contribute to fugitive dust emissions. The Final EIS has been revised to expand the discussion of the relationship between fallowed agricultural lands and potential air quality impacts. Specifically, **TA 7**, Air Quality, now incorporates a screening-level evaluation of fugitive dust emissions from fallowed acreage using generalized emission factors derived from U.S. Environmental Protection Agency guidance (AP-42). This addition provides a representative range of potential PM₁₀ emissions per acre of fallowed land. The Final EIS further clarifies the relationship between the air quality analysis and the fallowed acreage estimates presented in **TA 16**, Socioeconomics. Due to uncertainty in the location and extent of fallowing, the analysis remains regional rather than site-specific, which

is consistent with NEPA requirements. For more information on the geographic scope, see **Section R.3.19** theme response.

The Draft EIS addresses climate projections through hydrologic modeling that reflects observed and projected reductions in flows. The analysis evaluates how these conditions influence reservoir elevations, and hydropower generation. NEPA does not require attribution of specific hydrologic changes solely to climate trends where those effects are already embedded in the modeling framework. The analysis uses operational thresholds (e.g., minimum power pool elevations) as proxies to evaluate air quality and greenhouse gas impacts. Specifically, the shoreline exposure and associated emissions metrics are based on conditions corresponding to minimum power pool elevations. Accordingly, the Draft EIS takes a reasoned and technically supported approach to evaluating reservoir conditions, climate-related stressors, and associated air quality impacts. Additional figures showing long-term reservoir elevation trends have been added to strengthen the analysis.

The Technical Appendices include a comprehensive regional-scale analysis using established modeling methods, emissions estimates, and exposure indicators. The level of detail is appropriate for the scale and scope of operations considered in this EIS and supports comparison of alternatives. Community-by-community analysis is not appropriate because the project affects air quality at a broad, regional scale across multiple air basins. Additionally, the localized effects on air quality would depend on decisions by individual water users that are unknown and/or beyond Reclamation's control, e.g., voluntary participation in conservation activities. The analysis instead relies on regional modeling, emissions estimates, and surrogate exposure indicators (such as PM_{2.5} concentrations and shoreline exposure) to capture potential impacts. This approach aligns with NEPA guidance and avoids misleading precision that would result from attempting highly localized predictions given uncertainties in emissions, hydrology, and atmospheric processes.

R.3.27 Dams and Electrical Power

Theme Summary

Commenters requested that operations maintain protective elevations to ensure reliable hydropower at Glen Canyon Dam and Hoover Dam. They asked Reclamation to clarify minimum power pool constraints. There were requests to analyze the impacts on the hydropower market and rates, including the consequences for the Basin Fund. Commenters also emphasized the need to prioritize proactive infrastructure planning and ensuring reliable releases at low elevations. In addition, they requested evaluation of bypass options or phased decommissioning scenarios, as well as wear and maintenance needs under extended low elevations. Additional requests were made to clarify the legal status of hydropower's role relative to Compact compliance. Finally, commenters asked for an evaluation of additional upstream and downstream facilities, including the downstream safety implications of flow variability at Davis Dam and of extended low-flow operations at CRSP facilities.

Response

Reclamation recognizes the need to clarify minimum power pool and turbine operability constraints by evaluating how often, how long, and how severely reservoir elevations fall below key operational

thresholds under different management approaches. **TA 15**, Dams and Electrical Power Resources, provides figures such as **TA 15-13**, illustrating how frequently Lake Powell remains above elevations necessary for sustained turbine operation, while **Figures TA 15-11** and **TA 15-6** show how turbine availability and generating capacity at Lake Mead/Hoover Dam decline as reservoir levels decrease. Together, these results demonstrate that protective elevation thresholds are used as risk-screening tools to understand infrastructure vulnerability and operational tradeoffs under uncertain future conditions, rather than as fixed operational requirements that dictate reservoir management. Operations and management plans are ongoing and evolving to the conditions of lowered water elevations.

Within **TA 15**, **Section TA 15.1.3** evaluates the infrastructure conditions and operational capabilities of the dams analyzed in this study. Reclamation utilizes the Dam Safety Priority Rating (DSPR) system at all dams evaluated in this analysis to conduct routine monitoring, support maintaining infrastructure, and identifying any potential risk. Under this system, Glen Canyon Dam and Hoover Dam were rated as a DSPR 5 category, indicating a low-priority level with normal urgency of action. This reflects that no immediate safety concerns have been identified. Davis Dam and Parker Dam were equally classified as a DSPR 4 Category, indicating a low urgency of action. Both dams were magnitude below Reclamation's PPG threshold. Both dams were determined to be in good overall condition and do not display any risks to safety.

Extended low-flow operations have been modeled by the Western Area Power Association at CRSP facilities, and potential effects on the Upper Colorado River Basin Fund. Concepts such as bypass construction or phased decommissioning represent separate, long-term infrastructure planning considerations that would require independent engineering evaluation, legal review, and project-specific environmental analysis outside the scope of this EIS.

Rate impact analyses have been developed to help evaluate how forecasted hydrologic and operational outcomes may influence market conditions and financial pressures under sustained low-storage scenarios at dams evaluated in this study. Updated modeling for Glen Canyon Dam and Hoover Dam, with clarifying language, is available in the Final EIS and **TA 15** addressing Wholesale Rate Analysis, Power Marketing, and, for CRSP and Glen Canyon Dam, discussion of considerations for the Basin Fund.

R.3.28 Geomorphology and Sediment

Theme Summary

Commenters expressed support for establishing a maximum monthly release volume to reduce the potential for sediment scour. They also supported a requirement for HFEs to occur within a specified time period after sediment delivery thresholds are met. Additionally, commenters suggested adopting binding HFE criteria that are aligned with sediment conditions and timing that reflects a natural hydrograph. They requested expanded analysis of system-scale sediment balance and sediment processes within Lake Powell, including delta evolution, storage loss, and mobilization under low pools.

Response

Reclamation acknowledges the recommendations for a fixed monthly release limit to protect sediment for HFEs and fixed timing for HFEs. The EIS evaluates operational guidelines and strategies and recognizes that future operations must remain responsive to hydrology, system conditions, and applicable legal and operational requirements. Reclamation will use LTEMP guidelines, including the planning and implementation team process that helps assess monthly release volumes. Existing LTEMP guidelines were incorporated in the modeling for the EIS analysis, and modifications to the LTEMP framework are outside the scope of this analysis.

The EIS is focused on post-2026 guidelines and coordinated management strategies for Lake Powell and Lake Mead. A basin wide sediment management plan for the entire CRSP system would be a broader effort outside the scope of this EIS.

Since 1963, Lake Powell has lost approximately 1.8 maf (6.8 percent) of storage capacity (Root and Jones 2022), with most sediment deposited in upstream areas above elevation 3400 feet. As reservoir elevations decline under all EIS alternatives, sediment deltas in Glen Canyon National Recreation Area are increasingly exposed, eroded, and incised by river channels, particularly along the Colorado River and major tributaries. These processes are already documented in the EIS with respect to visual resources, shoreline conditions, invasive vegetation, and exposed sediment surfaces.

Quantitative prediction of sediment redistribution under alternative reservoir levels would require a reservoir-scale sediment transport model, which does not currently exist for Lake Powell. While continued reservoir lowering is expected to increase delta erosion and downstream redeposition of sediment, this redistribution does not change total sediment volume. If deltaic sediments shift from upstream areas into deeper portions of the reservoir, the migration of such sediments is not expected to impact withdrawals from Glen Canyon Dam. While available data and modeling limitations constrain quantitative assessment of alternative-specific sediment behavior within Lake Powell, Reclamation has clarified in the EIS that Lake Powell has sufficient dead storage capacity to trap most incoming sediments, with only a small amount reaching areas near the Glen Canyon Dam. Thus, sedimentation is not projected to impact dam safety, power generation, or the sediment concentration of Glen Canyon Dam during the analysis timeframe of this EIS.

R.3.29 Hydrologic Resources**Theme Summary**

Commenters requested an expanded quantitative groundwater analysis, including groundwater levels, pumping, subsidence, water quality, springs, alluvial aquifers, and secondary impacts from increased groundwater pumping to offset surface water shortages.

Commenters also requested analysis of daily flow, ramping, and timing effects in the Grand Canyon, and asked that the timing, frequency, and duration of resource impacts receive the same level of attention as whether impacts occur at all.

Additional comments addressed Upper Basin and Lower Basin conservation pools, requesting more detailed analysis of their effects and greater clarity on how conservation activities influence reservoir

storage, releases, and system water, including how often conservation tools are used and how they help mitigate risk.

Response

The EIS recognizes the role of groundwater in supporting surface water processes, ecosystems, and water supplies. Regional-scale changes to groundwater are complex and difficult to quantify without extensive data records and groundwater models, and current data on groundwater at a regional scale is limited in both scope and historical duration. As a result, groundwater conditions, including levels, pumping, and connectivity to surface waters, are addressed at a qualitative level where applicable. Where more recent groundwater data is available, it has been used to explore trends near Lake Powell (**Section TA 3.1.3**) and Lake Mead (**Section TA 3.1.6**), drawing on the Arizona Department of Water Resources' groundwater site inventory.

With respect to the timing, frequency, and duration of resource impacts, the metrics and thresholds used in this analysis reflect the most important dimensions of system performance without implying more certainty than is warranted. Including additional analysis of the timing and duration of impacts would emphasize outcomes that are highly dependent on the specific sequencing of future flows and would therefore be more speculative than the analyses presented in the EIS. Robustness figures presented in the EIS are broken out by decade to provide insight into how performance may vary over time, and the text describing these figures has also been revised for clarity in response to comments. Daily flow, ramping, and timing effects in the Grand Canyon, however, are outside the scope of this EIS.

With respect to conservation pools, analysis of the effects of conservation activity on Lake Powell and Lake Mead storage can be found in **Figures TA 3-16** and **TA 3-17**, respectively. This includes the effects of both Upper Basin and Lower Basin conservation mechanisms. Additional information on the conservation mechanism is provided in **Section R.3.8**, Lower Basin Conservation and Storage and Delivery of Conserved System and Non-System Water.

R.3.30 Indian Trust Assets

Theme Summary

Tribes expressed concerns that the Draft EIS does not adequately address the Federal Government's trust responsibility because there may be water shortages to tribes. Similarly, tribes expressed concerns about some alternatives not honoring their water rights, which may have senior priorities. Tribes commented that post-2026 operations must respect the U.S.'s fiduciary obligations: decreed, settled, and federally reserved tribal rights are trust property that cannot be impaired, reallocated, or subordinated through administrative guidelines. Commenters seek transparency, analysis of leasing and storage arrangements, and tools (i.e., conservation, storage, protection pools, etc.) that are voluntary, compensated, time-limited, and explicitly non-prejudicial. Tribes also noted that unquantified, undeveloped, or unused tribal water should remain attributed to tribes and not be presumed available to other users in modeling or converted to system water. Tribes noted that reductions in water allocations would reduce the ability of tribes to manage their own resources and be self-sufficient and would negatively impact culturally important farming activities. Some commenters desired more tribe-specific analysis and representation in published

figures and tables. Finally, some commenters stated that the potential socioeconomic impacts associated with potential impacts on Indian trust assets should be analyzed more thoroughly and for individual tribes.

Theme Response

Reclamation recognizes the importance of tribal sovereignty, tribal water rights, and Reclamation's trust obligations consistent with congressional directives. Reclamation also recognizes the wide range of tribal perspectives expressed in the comments. Reclamation's Proposed Federal Action would be adopted and implemented consistent with the Law of the River, as explained in **Section 1.2**. Some components of the alternatives analyzed are within Reclamation's existing authorities, and some are outside existing authorities, as explained further in **Section 2.3** and therefore Reclamation would need additional agreements or other authorities to implement some of the analyzed operations. The assumptions used in Shortage Allocation Models and Alternative Distribution Models are not intended to represent current or future policy with respect to shortage sharing or to limit Secretarial discretion to distribute shortages, as noted on Page C-5 of **Appendix C**, Shortage Allocation Model and Alternative Distribution Model Documentation.

Tribal participation in any potential conservation pools would be voluntary; any modeling assumptions regarding participation in potential conservation pools are for the purposes of modeling only and are not binding, as further explained in **Chapter 2**.

Tribe-specific modeling results related to tribal water deliveries or shortages to tribal entitlements are available for the Shortage Allocation Models and Alternative Distribution Models (see **Appendix C**). In the technical appendices, the DMDU analysis was not applied to any individual users, including tribes. This approach to analysis is appropriate given the level of uncertainty in hydrology and distribution of impacts, and because entitlement-specific results are provided in **Appendix C** for the full range of modeled shortages. The DMDU analysis is designed to provide representative information to the public to compare the modeled frequency of shortage events to groups that experience similar impacts due to water entitlement priorities. This is not intended to imply that Reclamation believes the impacts are the same to all water users in a priority group. Reclamation recognizes that potential impacts on Indian Trust Assets, particularly potential reductions in water deliveries, could have adverse socioeconomic impacts to tribes. **TA 16**, Socioeconomics, includes discussion of potential changes to agricultural and recreational economies, as well as broad negative socioeconomic consequences that are representative for tribes and others. Because of unique circumstances for each tribe, the potential socioeconomic impacts would vary by tribe but are captured within the range of impacts identified in the Final EIS.

Reclamation intends that any new tools (i.e., conservation, storage, protection pools, etc.) would be voluntary and non-prejudicial to a tribe's ability to develop and use its entitlement. Additionally, for tribal water entitlements, the operational guidelines do not lose, forfeit, or abandon the corpus of the trust asset. The trust asset would be administered as defined in the statute, decree, and/or contract defining and establishing the entitlement, including any conditions relating to the obligation of the U.S. to deliver water subject to availability under the provisions of Federal law, including the Colorado River Compact, the BCPA, and the Consolidated Decree in *Arizona v. California*. Shortage administration of the entitlement would not limit greater future deliveries to tribes under improved

hydrology in normal or surplus Colorado River conditions, nor would it alter the applicable authority that defines the entitlement. Nor do the guidelines alter or amend any Indian water rights settlements or decrees, nor preclude or limit future Indian water rights settlements. Nothing in the analysis should be construed to limit ongoing or future quantification or development of tribal water rights.

R.3.31 Population and Land Use

Theme Summary

Commenters stated that the Draft EIS does not adequately explain how modeled reductions in domestic (municipal) water deliveries, particularly in Arizona and other Lower Basin municipal service areas, could affect population- and land-use-related outcomes, including concrete economic and social consequences. Commenters stated that the Draft EIS presents modeled delivery reductions but does not adequately explain what those reductions could mean for specific industries and users, development, housing, essential services, operations, adaptation efforts, and broader socioeconomic conditions. To reflect the wide-ranging themes raised by commenters and support efficient cross-referencing to summary responses, the discussion is organized using subheaders.

Development, housing, and growth plans: Commenters stated that reduced reliability of domestic water delivery could constrain residential and commercial development and affect housing supply in communities. Commenters emphasized the role of planning and regulatory requirements for reliable water supply and stated that reduced domestic water reliability could affect the ability of communities to meet existing plans for growth and development.

Existing communities and essential services: Reduced reliability of domestic water delivery could affect existing residents and essential services, including potable water, sanitation, fire protection, and other critical community functions. Commenters also raised concerns that an abrupt or severe domestic shortage could occur and impact essential services.

Infrastructure and operational thresholds: Municipal systems and conveyance/treatment infrastructure and distribution systems may not be designed to accommodate abrupt or deep reductions, and that short-duration disruptions can create operational challenges that differ from long-term average conditions. Commenters highlighted operational thresholds and system constraints and requested clearer discussion of how infrastructure constraints could affect community outcomes, particularly under extreme Shortage Conditions.

Adaptation capacity: Several commenters highlighted that adaptation capacity varies widely by provider and location, noting that while conservation and portfolio management can reduce vulnerability, other responses may be limited by physical availability, legal/jurisdictional constraints, cost, and the time required for planning, permitting, financing, and implementation.

Conservation and demand: Some commenters emphasized that population and land use are not direct proxies for water demand and that conservation and demand management can decouple water use from population growth. Others noted that existing conservation efforts and remaining

conservation potential vary by community, affecting how shortages may translate into land-use-related outcomes.

Model interpretation and limitations: Some commenters questioned how domestic deliveries are modeled and how results are interpreted and requested a clearer explanation of assumptions and limitations. Commenters also raised concerns about how the analysis treats extreme conditions and key thresholds and how such conditions could affect municipal reliability and community outcomes.

Secondary effects: Commenters requested more explicit consideration of secondary effects, including economic pressures, housing affordability, local tax base implications, land conversion pressures, and impacts on public services and community well-being. Some commenters also described indirect pathways tied to substitution (e.g., increased reliance on groundwater and associated depletion/subsidence/water-quality concerns) and broader community consequences.

Economic analysis: Many commenters also requested more robust, quantitative analysis of economic impacts on municipal and industrial sectors. Commenters requested Reclamation implement a range of approaches to quantify domestic water delivery impacts, including but not limited to, macroeconomic and regional economic impact analysis; sector-specific impact analysis; municipal- or utility-level economic analysis; housing and development quantification; infrastructure cost and damage estimates; public health and essential services quantification; adaptation cost and feasibility analysis; distributional or equity impact analysis; national or supply-chain impact analysis; and temporal and risk-based quantification.

Agricultural Lands Use: Commenters requested review of baseline data related to irrigated lands. In addition, they requested additional information regarding impacts on the agricultural system as a whole. Some commenters requested information pertaining to Upper Basin geographies as well as analysis of groundwater as a replacement source and potential for crop-switching.

Theme Response

Development, housing, and growth plans: The Final EIS has been revised to clarify that potential impacts could include changes to planning assumptions for water supply related to residential and commercial development and links the discussion to modeled delivery outcomes reported in **TA 4**, Water Deliveries.

Existing communities and essential services: The Final EIS has been revised to further clarify the potential qualitative impact from reduced municipal delivery reliability and recognizes that the feasibility and timing of adaptation vary by community. The Final EIS also recognizes that reduced municipal delivery reliability may affect essential services and public health and safety in some communities, particularly under severe or rapid shortage, and acknowledges that local emergency response planning and implementation actions would occur outside the scope of this EIS.

Infrastructure and operational thresholds: Reclamation recognizes that severe or abrupt delivery reductions can create operational challenges for conveyance and treatment systems and may affect service reliability depending on local infrastructure and operational constraints. The Final EIS

discusses these effects as qualitative pathways linked to modeled delivery outcomes; due to data limitations, it does not adopt facility-specific cost or damage estimates.

Adaptation capacity: The Final EIS recognizes that adaptation measures (e.g., new supplies, infrastructure, treatment, interconnections, and financing) can require substantial time and resources and may not be available on the same schedule for all communities. Accordingly, the Final EIS discusses adaptation feasibility qualitatively and focuses on the modeled frequency and magnitude of delivery reductions to characterize exposure, while noting that specific local project decisions would occur outside the scope of this EIS.

Conservation and demand: The Final EIS clarifies that population and land-use context are not treated as direct proxies for consumptive water demand. The Final EIS recognizes that conservation and demand-management measures can decouple water use from population growth and uses modeled shortage and conservation outputs to describe potential future conditions.

Model interpretation and limitations: The Final EIS acknowledges that Shortage Allocation Model and Alternative Distribution Model results reflect the modeled allocation frameworks and assumptions documented in **Appendix C**, Shortage Allocation Model and Alternative Distribution Model Documentation, and do not represent all possible future place of use transfers or programmatic adjustments; therefore, the Final EIS uses **TA 4**, Water Deliveries, outputs to describe exposure and potential pathways for effects while identifying limitations where appropriate. The Final EIS also addresses key reservoir elevation thresholds and associated operational risks through the robustness and vulnerability analyses and resource-specific evaluations.

Secondary effects: Reclamation acknowledges that secondary effects may extend beyond direct domestic delivery changes. Where these outcomes are raised as reasonably foreseeable pathways, Reclamation addresses them qualitatively and, where appropriate, notes that such effects may be influenced by connected actions and cumulative effects outside Reclamation's direct authority, consistent with the framing in **Appendix R, Section R.3.21**.

Economic analysis: The Final EIS discusses domestic water delivery impacts as indicators of potential effects on communities and land-use related conditions by providing a qualitative discussion of municipal impact pathways using the modeled delivery-reliability and shortage outputs from **TA 4**, Water Deliveries, and documents limitations in **Appendix C**, Shortage Allocation Model and Alternative Distribution Model Documentation. This approach recognizes that local outcomes depend on many factors outside federal operational control (including land-use decisions, provider-specific portfolio composition, and the timing and feasibility of adaptation measures).

Reclamation acknowledges concerns about potential effects on industrial and manufacturing sectors and other industries that rely on water supplies. The Final EIS has been revised to clarify the socioeconomic connection between modeled domestic water deliveries and employment sectors that rely on domestic water. It does not adopt sector-specific production or employment forecasts without consistent, comparable datasets and modeling inputs across the analysis area.

Agricultural Land Use: Baseline data was reviewed per comments and verified to accurately represent the cited data. Reclamation added an acknowledgment that other industries, such as

transportation and warehousing, manufacturing, which rely on the farming industry, could experience additional impacts. Broader economic relationships and indirect effects of changes in agricultural activity are addressed at a summary level in the Socioeconomics analysis (**Section 3.16**).

It is not possible to do a quantitative analysis on the impacts from switching to groundwater due to the uncertainties surrounding the quantity of groundwater switching, groundwater availability, and groundwater cost. See **Section R.3.19**, Scope, related to Upper Basin analysis.

The analysis addresses adaptive actions at a programmatic level to describe potential changes in land use patterns and consumptive water use. The Final EIS does not assume crop substitution is feasible or would result in sustained consumptive use reductions in all cases, and it does not distinguish quantitatively between crop substitution and fallowing in the land use analysis.

R.3.32 Recreation

Theme Summary

Commenters requested that the analysis be expanded to include recreation areas and resources beyond the defined analysis area, such as tributaries to the Colorado River, downstream national park infrastructure, and river-based recreation below Parker Dam. In addition, some commenters suggested reevaluating optimal flow ranges for whitewater boating based on available literature. Others requested further analysis of sediment-related hazards, including features such as perched channels and waterfalls, and their implications for whitewater recreation.

Response

Reclamation acknowledges the request to analyze additional recreational resources beyond those within the defined analysis area. The recreation analysis is consistent with the geographic scope defined in **Section 3.2.1**, Geographic Scope, of the EIS. Tributaries to the Colorado River are beyond the scope of the EIS. Recreational uses below Parker Dam are described in **Section TA 14.1.6**, **TA 14.1.7**, and **TA 14.1.8** of **TA 14**, Recreation. Flows below Hoover Dam are consistently low due to upstream diversions and delivery obligations. As a result, the range of operational changes evaluated across the alternatives would not meaningfully alter flow conditions in a manner that would measurably affect recreation opportunities in this reach. This rationale has been added to **TA 14**, Recreation.

The analysis relies upon available studies and the best available scientific information. These sources and literature were reviewed again, and it was determined that optimal flow ranges reported in the analysis were consistent with reported whitewater boater preferences.

In response to comments requesting analysis of sediment-related hazards to whitewater boating, Reclamation acknowledges that changing sedimentation dynamics resulting from low water have resulted in the creation of waterfalls, including the Piute Farms Waterfall and Pearce Ferry Rapid, which are acknowledged in the EIS as they relate to fish passage, and in **TA 14**, Recreation, in relation to whitewater navigability. Additional discussion regarding the potential development of another waterfall near Hite has been added to the EIS and **TA 14**.

R.3.33 Socioeconomics

Theme Summary

Note that comments related to concerns about economic analysis of municipal and industrial impacts are addressed under the theme summary and response in **Section R.3.31**, Population and Land Use. Comments related to concerns about impacts on economic conditions from changes in hydropower generation at Lake Powell are addressed under the theme summary and response in **Section R.3.27**, Dams and Electrical Power.

Commenters expressed concern that certain impacts on economic and social conditions from changes in agriculture were not included in the analysis, such as impacts on indirect industries, health and education services, the well-being of communities from potential increases in dust, and the national food supply chain. They recommended inclusion of additional sector-specific data sources and reports, additional costs that agricultural entitlement holders would incur, and recognition that agricultural decisions extend beyond simple fallowing of least-profitable crops. Some commenters are concerned that the analysis of socioeconomic impacts did not fully represent the magnitude and severity of impacts from changes in agriculture, especially when the results represented the fallowing of entire crops or acreages in a region. Other commenters requested consideration of conservation programs and adaptation measures, such as crop switching or conservation incentives, that would likely be used to lessen the reported impacts. Commenters expressed concern that the impacts on economic and social conditions from changes in agriculture were inaccurate because the analysis considered changes in water deliveries to agricultural entitlement holders, rather than changes in water deliveries to end users through certain leasing or transfer arrangements with the entitlement holders. Additionally, commenters requested that the results of the analysis be provided on a more granular scale than state-level.

Commenters further noted that recreation, particularly on Lake Powell, Lake Mead, and the Colorado River, represents an important economic contribution to the region and that a reduction in water in the reservoir would impact the tourism industry and the communities that depend on it. They also noted the economic importance of hydropower operations. Commenters also requested the addition of analysis related to recreation economic contributions associated with Lake Mohave and Lake Havasu and the vicinity of these areas.

In addition, commenters requested that Reclamation revise the socioeconomic discussion to include a more comprehensive analysis of the market and non-market river recreation values, as well as a review of non-market analysis to ensure consistency with other resource sections.

Theme Response

As discussed in **Section TA 16.2.1**, the modeling of impacts on economic conditions from changes in agriculture includes indirect impacts, which are impacts that result from changes in economic activity in industries that sell inputs to the industries that may be directly affected (for example, indirect impacts include changes in supply purchases made by agricultural producers or farmers). To provide context to the impacts analysis and address commenters' concerns, in the Affected Environment of the Final EIS, Reclamation added an acknowledgment that the farming industry supports other non-farming industries such as the transportation and warehousing, manufacturing

(including food manufacturing), and retail trade (including food and beverage and grocery stores) industries. In **Section TA 16.2.2** of the Draft EIS, there is a discussion about the impact on quality and access to nonmarket values and social conditions from changes in water allocation for irrigation entitlement holders, including impacts on affordable health and dental care. In the Final EIS, Reclamation added additional detail that there could be impacts on funding to support public services such as education and that these impacts could affect communities that rely on agriculture to support the economy and public services. Additionally, to address the concerns of commenters, in the Final EIS, Reclamation added an acknowledgment of the impacts on the national food supply chain due to changes in regional and local agriculture as well as the impacts on communities' quality of life from changes in dust associated with increased fallowed lands.

In the Final EIS, Reclamation referenced the reports provided and added a table with the new data source as well as added qualitative discussions on the assumption of fallowing lower valued crops first and the additional costs associated with fallowing that agriculture entitlement holders could incur.

To address the views that the analysis did not fully represent the magnitude and severity of impacts from changes in agriculture, in the Final EIS, Reclamation added additional detail highlighting the alternatives and shortage levels that would result in the potential fallowing of entire crops or acreages in a region.

To address commenters' requests to consider conservation programs and adaptation measures, Reclamation clarified that although the analysis does not assume funding or incentives for fallowing or conservation—as compensation measures are out of scope of this EIS—conservation programs and adaptation measures could be implemented in the future and would lessen the impacts discussed in the EIS. Additionally, as discussed in the Assumptions subsection of **Section TA 16.2.1** of the Draft EIS, Reclamation acknowledges that there could be crop switching rather than crop fallowing as a response to irrigation water shortages; however, the assumption that farmers would fallow irrigated crops in response to water shortages provides a bound to the analysis and any changes in this assumption would likely result in fewer impacts than discussed.

As discussed in the Assumptions subsection of **Section TA 16.2.1**, the Shortage Allocation and Alternative Distribution Models do not attempt to replicate arrangements where an entitlement holder leases its entitlement to other end users, and Reclamation cannot predict how the entitlement holder and its lessee(s) would respond to shortage. In the Final EIS, Reclamation added a note that if an entitlement holder leases water to another type of user, then a shortage in water deliveries would likely result in a financial impact on the entitlement holder as well as an impact from a reduction in water availability on the end users, similar to those impacts discussed for agricultural end users or discussed in **TA 17**, Population and Land Use, for municipal and industrial end users. The economic impact of the reduced delivery to the lessor would be to some degree mitigated by the financial payment from the lessee, while the benefits to the lessee of increased water delivery would possibly exceed the negative economic impact of reduced deliveries to the lessor.

Regarding the granularity of the analysis, the analysis was conducted commensurate with the level of decision making and based on the best available data at the time of the report. While the magnitude

of impacts might vary across entitlement holders, the nature and type of impacts that are discussed in the Draft EIS are consistent across all entitlement holders. In the Final EIS, Reclamation acknowledges that impacts on economic and social conditions from changes in agriculture across the alternatives vary across priority groups within each state, and Reclamation revised the results shown in **TA 16**, Socioeconomics, of the Final EIS to show impacts by priority group within each state as well as at the state level. Priority groups are used to represent the individual entitlement holders who would experience similar application of potential shortages under a given shortage scenario as defined in the Shortage Allocation Model and Alternative Distribution Model (**Appendix C**).

Recreation economic analysis was included in the Draft EIS at a level corresponding to that of a programmatic analysis (see **Section 3.16** and **TA 16** for economic contributions of recreation and tourism). Additional analysis related to economic contributions from recreation below Hoover Dam was not included as flows below the Dam are consistently low due to upstream diversions and delivery obligations. As a result, the range of operational changes evaluated across the alternatives would not meaningfully alter flow conditions in a manner that would measurably affect recreation opportunities or associated economic contributions in this reach.

R.3.34 Cultural Resources

Theme Summary

Commenters raised concerns about how reservoir operations and fluctuating water levels affect cultural and archaeological resources, noting that both shoreline exposure and re-inundation can damage or degrade sites. Commenters also called for improved transparency in the cultural resources analysis, including discussion of the limitations of survey coverage, clearer explanation of the preservation risk model, and continued government-to-government consultation with tribes to ensure culturally significant resources are accurately identified and protected.

Response

Reclamation acknowledges that changing water levels at Lake Powell and Lake Mead may expose previously undocumented cultural resources and that the potential effects of post-2026 operating Guidelines upon such cultural resources are not yet fully known, in large part because uncontrollable hydrology will determine such effects. The analysis incorporated available information from existing studies, prior consultation, cultural resources inventories, tribal input received during scoping and ongoing consultation, and resource analyses prepared for related Colorado River operation programs. As described in the Draft EIS cultural resource analysis, Reclamation conducted a Class I cultural resources inventory, consisting of a records search and literature review of previously identified cultural resources and prior survey efforts along the Colorado River corridor to help inform the analysis, identify data gaps and areas with limited survey coverage, and support development of the preservation risk model.

Section 106 of the NHPA requires that federal agencies consider the effects of their projects on historic properties and consult with stakeholders to avoid, minimize, or mitigate potential adverse effects. Reclamation, in consultation with the Arizona, California, Utah, and Nevada State Historic Preservation Offices, land managing agencies, tribes, and other consulting parties, is currently developing a programmatic agreement in accordance with Section 106 of the NHPA to address

potential adverse effects from post-2026 operating guidelines. The programmatic agreement is intended to establish a framework for ongoing identification efforts, consultation, monitoring, and treatment of historic properties that may be affected by the implementation of post-2026 operating guidelines. Reclamation will continue to engage with tribes and consulting parties throughout this process to help ensure that culturally significant resources are properly identified and considered.

R.3.35 Tribal Resources

Theme Summary

Commenters, including tribal representatives, stated that impacts on tribal resources should be analyzed at the tribe-specific level with explicit linkages between operational alternatives and ecological, cultural, subsistence, and spiritual uses, unique to each tribe. Commenters also request recognition of landscape-scale traditional cultural properties (e.g., Grand Canyon), emphasizing that these areas hold cultural, spiritual, and ecological significance extending beyond individual sites. Commenters recommended integration of Indigenous ecological knowledge and tribal perspectives into the analysis and decision-making process and further protections for trails and traditional water systems (e.g., acequias).

Theme Response

Reclamation recognizes that tribes maintain unique cultural, spiritual, ecological, and subsistence relationships with lands and waters within the Basin and that these relationships may vary substantially among tribes. The analysis in the Draft EIS was intended to evaluate potential environmental impacts at a programmatic operational level appropriate to the development of post-2026 operating guidelines and analyzed categories of potential effects associated with changes in reservoir elevations, hydrologic, and river operations across the Basin.

Portions of the affected area, including resources within the Grand Canyon corridor, are subject to ongoing consultation, monitoring, and treatment measures under the Glen Canyon Dam LTEMP Programmatic Agreement (PA). The LTEMP PA and corresponding Historic Preservation Plan provide an established framework for continued consultation with tribes and consulting parties regarding cultural resources and traditional cultural properties affected by operations associated with Glen Canyon Dam. Reclamation anticipates coordinating, as appropriate, with existing commitments and processes under the LTEMP PA to support continued consideration of effects in areas where authorities and agreements may overlap.

Reclamation acknowledges that certain areas of the Basin have been identified by tribes as traditional cultural properties or broader cultural landscapes that possess cultural, spiritual, historical, and ecological significance. Reclamation recognizes that the significance of these areas may derive not only from the presence of individual archaeological sites or historic properties, but from the interconnected character of the landscape as a whole, including natural features, traditional use areas, trails, water sources, and cultural relationships. Areas such as the Colorado River and the Grand Canyon have been identified by tribes as possessing this type of landscape-scale cultural significance, and Reclamation will continue to consider tribal input regarding these resources through ongoing consultation and related compliance processes, including Section 106 of the NHPA and coordination under existing agreements such as LTEMP in applicable areas.

Reclamation is grateful for the efforts tribes have made to consult on this EIS, and Reclamation remains committed to consultation with tribes throughout the NEPA and Section 106 processes and will continue to coordinate with tribes regarding culturally significant resources, traditional knowledge, and potential effects to tribal interests. Tribal input received through consultation helps inform Reclamation's understanding of culturally important places, traditional resource uses, trails, water systems, and other features and considerations that may not be fully captured through conventional archaeological or environmental review methods. Information provided through consultation, where appropriate and consistent with tribal confidentiality concerns, may inform future identification efforts, management strategies, and implementation measures. Impacts on vegetation, fish, and wildlife are addressed in other sections.

R.3.36 Vegetation

Theme Summary

Commenters requested a more comprehensive and transparent analysis of vegetation and wetlands, including a better definition of historic conditions, clearer explanations of modeled results, and updates to acres exposed since 2011. Commenters noted the lack of detailed information about where impacts would happen and how many acres could be affected. Commenters also requested that additional information regarding newly exposed side canyons around Lake Powell be added to the analysis.

Response

The EIS was updated to address comments regarding wetlands and vegetation to clarify the analytical approach used to establish baseline conditions and effects under each alternative. The vegetation analysis evaluates marsh and woody riparian vegetation using the DMDU framework to assess potential impacts across alternatives under highly uncertain conditions. Given the high level of hydrologic uncertainty, it is difficult to predict under each alternative exactly where or how much habitat might be lost or gained over the 34-year time period. Therefore, results are provided as a comparative analysis rather than species-specific or site-specific evaluations. Where long-term monitoring data is available, the analysis includes modeled estimates of suitable habitat for marsh and woody riparian habitat. Additional information was added to the EIS to further address impacts to newly emerged side canyons around Lake Powell.

R.3.37 Visual Resources

Theme Summary

Commenters requested additional analysis of the visual impacts related to dead pool conditions at Lake Powell, recognition of re-emerging side canyons becoming available for recreation access, and broader inclusion of "attraction features" or other viewing locations in the analysis.

Response

Text was added discussing the re-emergence of side canyons, directing readers to the Recreation section regarding public access related to reservoir inundation, and clarifying the "attraction features" concept, with additional viewers (viewing locations) currently described under Issue Statement 2. The concept of Lake Powell reaching dead pool elevation is described under Issue

Statement 3 as the effects on visual character would occur from water being unable to flow past Glen Canyon Dam, affecting landscape character along the Colorado River and downstream, therefore no additional analysis has been included.

R.3.38 Water Deliveries

Theme Summary

This section summarizes comments on the framing and analysis of the water deliveries section of **Chapter 3** and **TA 4**, Water Deliveries. Comments related to the volume and distribution of Lower Basin shortages, distribution of dead pool-related reductions, and the use of conservation mechanisms and their interaction with shortages are addressed in **Section R.3.7**, Lower Basin Shortage and Use, and **Section R.3.8**, Lower Basin Conservation and Storage and Delivery of Conserved System and Non-System Water.

Commenters requested additional information on how evaporation associated with conservation mechanisms is assessed. Commenters also requested additional information and greater transparency regarding the modeling assumptions and methodologies used to evaluate water deliveries and reservoir operations, including the reliability of water deliveries under low-flow conditions. In addition, commenters noted that dead pool-related reductions were mostly separate or absent from analyses across multiple resources and that the analysis should include information about the frequency and duration of such reductions to better demonstrate the effectiveness of operational elements across alternatives. Finally, commenters requested greater transparency regarding the minimum water deliveries available to municipal users to meet health and safety needs.

Theme Response

Reclamation acknowledges the comments requesting additional information and greater transparency regarding the evaluation of water deliveries and reservoir operations. **TA 4**, Water Deliveries, provides an overview of how water deliveries vary among the alternatives, including the effects of different shortage distribution approaches across the range of modeled hydrologic conditions. For more detailed information on how different shortage distribution methods represented by the alternatives affect water deliveries to individual water users by priority group, see **Appendix C**, Shortage Allocation Model and Alternative Distribution Model Documentation, which documents the modeling assumptions and results used to evaluate alternative approaches to distributing Colorado River water supplies under the alternatives analyzed in this EIS.

TA 4 has also been revised to improve transparency regarding the effects of conservation activity modeling assumptions on Lake Mead dead pool-related reductions (see **Figure TA 4-6**). Information describing the conservation mechanisms incorporated into each alternative, including the associated evaporation assessment, is provided in **Appendix B**, Modeling Assumptions: Lake Powell and Lake Mead Storage and Delivery of Conserved Water. The volumes of water needed to meet municipal health and safety needs are highly variable depending on water user infrastructure, water supply portfolios, and many other factors. If more detailed evaluation of municipal health and safety deliveries becomes necessary in the future, Reclamation would conduct more targeted analyses and communicate the process and results to the public.

R.3.39 Water Quality

Theme Summary

Commenters requested additional information on salinity, including whether salinity impacts were considered for each alternative, and what thresholds were used to determine significance.

Commenters also requested clarifications on the description of perchlorate, including characterizing perchlorate in Las Vegas Wash flows to Lake Mead as an active and ongoing concern, removing the characterization of this contamination source as a point source, and clarifying the difference between the human health impacts associated with exposure duration to per- and polyfluoroalkyl substances versus perchlorate.

Commenters requested discussion or analysis of water quality concerns in the CAP system if deliveries are significantly reduced.

Commenters also provided general water quality comments that did not raise substantive issues requiring further response.

Response

Reclamation analyzed salinity under each alternative in **Chapter 3** and **TA 6**, Water Quality; therefore, no further changes were made to the salinity analysis.

The water quality section was updated to address concerns with the characterization of perchlorate in the EIS by noting the active and ongoing concerns with perchlorate in the Las Vegas Wash and its associated monitoring and mitigation. The water quality section was also updated to remove the description of perchlorate contamination at Las Vegas Wash as a point source and to define health impacts associated with perchlorate by its human health impacts associated with acute and intermediate exposure.

Reclamation updated **Section 3.2** to clarify the geographic scope for analysis. Reclamation also updated the methodology in the water quality section (**TA 6** and EIS **Section 3.6**) to clarify that the analysis does not include impacts on municipal users since operations of municipal water providers fall outside of Reclamation's regulatory authority and are carried out independently by these third parties. Reclamation delivers raw (untreated) water along the Mainstream and CAP, and Reclamation does not warrant the quality of Colorado River water deliveries. Groundwater in Arizona is governed by state law, which is generally outside of Reclamation's jurisdiction, with limited exceptions based in federal law. Therefore, analysis of economic impacts associated with water quality was not included in the EIS.

Reclamation did not update the EIS based on general water quality comments that did not raise substantive issues requiring further response; however, Reclamation considered these comments as part of the NEPA process.

R.3.40 Wildlife: Fish and Other Aquatic Species

Theme Summary

Commenters requested clearer analysis linking dam operations, such as flow timing, flow quantity, and release temperatures, to aquatic habitat conditions, including riparian change, erosion, and habitat complexity, that support native fish communities. Many commenters emphasized the importance of minimizing nonnative fish entrainment through Glen Canyon Dam and maintaining temperature conditions protective of native species while also supporting recreational fisheries and hatchery operations. Commenters also requested an evaluation of potential ecological effects under low-flow conditions through the Grand Canyon, including algal blooms, fish die-offs, and impacts on downstream wetlands. Additional comments recommended evaluating operational and infrastructure tools, such as reservoir elevation management, selective withdrawal, temperature control measures, barriers, and mechanical removal programs, to address invasive species risks and maintain ecological thresholds for fish and aquatic resources.

Response

The EIS evaluates aquatic habitat and fish resources using the best available scientific information and modeling approaches appropriate for basin-scale analysis under uncertain hydrologic conditions. Habitat analysis links reservoir elevation and river stage to fish habitat using stage-to-habitat relationships derived from scientific literature. These relationships connect water surface elevation to the amount and type of habitat available to fish. Surface area and longitudinal analyses were used to evaluate changes in habitat extent in reservoir and river environments, with interpretation supported by the DMDU framework. The technical appendix also describes how different lake elevations affect fish habitat by species and life-history strategies.

The EIS includes analysis of listed fish species and other species of concern, with descriptions of distribution and abundance, habitat, and life history provided in the technical appendix and Attachment. Important tributaries, such as the Little Colorado River and Havasu Creek, are also addressed for their significance to humpback chub populations.

The analysis relies on available studies, comparisons with historical flow conditions experienced by fish communities over the past several decades, species life-history information, and modeling tools such as the Smallmouth Bass Model. The analysis evaluates connections among flow, reservoir elevation, water temperature (where data are available), and the potential for nonnative fish entrainment at Glen Canyon Dam. Temperature thresholds used in the analysis include maintaining temperatures below 16 degrees Celsius to limit smallmouth bass reproduction as far downstream as the Little Colorado River and to support the rainbow trout population in the Lees Ferry reach, and above 12 degrees Celsius to support humpback chub downstream of the Little Colorado River.

The EIS evaluates alternatives prior to selecting a preferred alternative and identifies potential trade-offs among resources using the DMDU framework. Conservation measures and mitigation to address potential impacts on listed species, including risks such as nonnative fish entrainment, will be developed during the ESA consultation process through preparation of a BA for the selected alternative.

R.3.41 Wildlife: Terrestrial

Theme Summary

Commenters requested a more comprehensive and transparent analysis of wildlife and habitat impacts. They stated that the document underestimates or omits significant effects on endangered species, LCR MSCP species, migratory birds, amphibians, and other wildlife across key ecosystems such as the Lower Colorado River, Glen Canyon restoration areas, urban landscapes, and the Salton Sea. Overall, commenters requested expanded biological analysis, clearer disclosure of impacts, and stronger consideration of habitat protection and water management measures to support sensitive species.

Response

The EIS evaluates wildlife impacts based on impacts on vegetation, as determined through modeling exercises to identify where habitat may change compared to the interim guidelines period. Given the high level of hydrologic uncertainty, it is difficult to predict under each alternative exactly where or how much habitat might be lost or gained over the 30-year time period. Therefore, results are provided as a comparative analysis rather than species-specific or site-specific evaluations. Many requested actions are outside of the geographic scope or jurisdiction of the EIS.

R.4 References

- Bureau of Reclamation (Reclamation). 2024. Technical Decision Memorandum – Establishment of Interim Operating Guidance for Glen Canyon Dam during Low Reservoir Levels at Lake Powell. U.S. Department of the Interior, Bureau of Reclamation. Internet website: <https://www.usbr.gov/uc/DocLibrary/Memos/20240326-EstablishmentInterimOperatingGuidanceGlenCanyonDamLowReservoirLevels-TechnicalDecisionMemo-508-TSC.pdf>.
- Root, J. C., and D. K. Jones, 2022. “Elevation-area-capacity relationships of Lake Powell in 2018 and estimated loss of storage capacity since 1963: U.S. Geological Survey Scientific Investigations Report 2022–5017”. Internet website: <https://doi.org/10.3133/sir20225017>.

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