



March 2, 2026

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Acting Commissioner
Bureau of Reclamation
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Sent via email

RE: U.S. Bureau of Reclamation's Draft Environmental Impact Statement for Post-2026 Operational Guidelines and Strategies for Lake Powell and Lake Mead

Dear Mr. Cameron,

The Grand Canyon Trust ("Trust") submits this letter to provide comments on the U.S. Bureau of Reclamation's *Draft Environmental Impact Statement for Post-2026 Operational Guidelines and Strategies for Lake Powell and Lake Mead* ("Draft EIS"). Reclamation proposes to adopt new guidelines and management strategies for the coordinated operations of Lake Powell and Lake Mead to replace current guidelines and agreements that expire in 2026. Reclamation acknowledges that careful management of the Colorado River is important because it is "the foundation for diverse resources across a large geographic region and faces exceptional challenges from prolonged drought and future uncertainty."¹ The agency further recognizes that the "actions taken over the past two decades have not been sufficiently robust to prevent continued decline of the reservoirs" and that new guidelines must "address the continued loss of storage and the potential for increasing severity of drought and low runoff conditions."²

The Trust is a 501(c)(3) non-profit advocacy organization founded in 1985 with a mission to safeguard the wonders of the Grand Canyon and the Colorado Plateau, while supporting the rights of its Native peoples. We are headquartered in Flagstaff, Arizona and have more than 3,000 members and supporters. For decades, we have worked across the four corners region to secure protections for important cultural landscapes, safeguard water from uranium mining pollution, defend the unsustainable withdrawal of groundwater for development, protect the Grand Canyon ecosystem, and restore healthy forests and springs. We appreciate the opportunity to comment on the proposal to adopt new interim guidelines for the operations of Glen Canyon and Hoover Dams and to address the imbalance of water supply and demand in the Colorado River Basin.

The Colorado River system is at a very precarious juncture. Over the past 26 years, the average natural flow of the Colorado River at Lees Ferry has declined about 20 percent—from the 20th century average of 15.2 million acre feet (MAF) to the 21st century average of 12.2 MAF.³ During the last six

¹ DEIS 1-1.

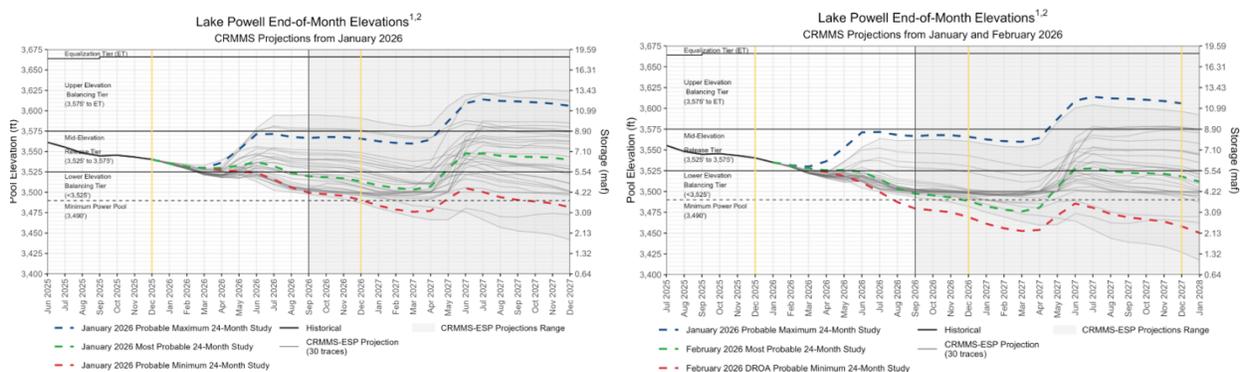
² DEIS at 1-1 and 1-2.

³ See Wheeler, K., Udall, B., Wang, J., Kuhn, E., & Schmidt, J.C., *What will it take to stabilize the Colorado River?* SCIENCE, Vol. 377, No. 6804, 373-375 (Jul. 21, 2022) <https://www.science.org/doi/10.1126/science.abo4452>; Colorado River Research Group, Colorado River Insights, 2025: Dancing with Deadpool, GETCHES-WILKINSON CENTER, UNIVERSITY OF COLORADO BOULDER, at page 18 (2025), <https://www.colorado.edu/center/gwc/ColoradoRiverInsights2025DancingWithDeadpool>.

years (2020-2025), the average natural flow reached 10.8 MAF and flows were even worse earlier this century (2000-2004), when the average was only 9.5 MAF.⁴ This decrease in water supply and our inability to match that with annual water use reductions has drained our water savings accounts in Lake Powell and Lake Mead. These reservoirs are currently less than a third full.

To complicate matters, 2026 is turning out to be an incredibly dry year. Upper Basin snowpack is trailing well below the median and tracking just below the snowpack in 2018, which resulted in flows that were less than half of the 30-year average.⁵ These conditions are like those in 2025.

Reclamation's most recent worst-case scenario projections (red dashed line) show that Lake Powell could reach minimum power pool (3,490 feet) in mid-July of 2026.⁶ This is six months earlier than it predicted in the January forecast. It is also notable that the "most probable" scenario (green dashed line) falls below power pool in December of 2026. The January forecast did not show the "most probable" scenario falling below power pool anytime throughout the 2-year projection period.



Lake Powell is reaching an elevation not seen since the reservoir was first filled more than 60 years ago. If water levels reach "minimum power pool" then no hydropower can be generated at Glen Canyon Dam. What's more, because the dam was not designed to operate at such low water levels, it is unclear whether water could pass through the dam's four remaining outlets into the Colorado River and the Grand Canyon without a significant safety risk to the infrastructure itself.

Glen Canyon Dam releases make up 92% of flows in the Colorado River through the Grand Canyon. As a result, the coordinated operation of Lake Powell and Lake Mead (as determined in the new guidelines) and the reliability of the dam's infrastructure directly determine the health of the Colorado River and the Grand Canyon.

The Grand Canyon is more than just a National Park and a UNESCO World Heritage Site⁷: it is an important cultural landscape of the ancestral and current homeland of at least a dozen tribes, and for many, their place of origin. Water flowing into and through the Grand Canyon in the Colorado River and

⁴ Colorado River Research Group Report *supra* note 4 at 18; DEIS at Appendix F, Figure F-2.
⁵ Water year 2018 resulted in an unregulated inflow into Lake Powell of 4.6 MAF, which is less than half of the 30-year average. National Water and Climate Center, Snow Water Equivalent in the Upper Colorado Region, USDA, https://nwcc-apps.sc.gov.usda.gov/awdb/basin-plots/POR/WTEQ/assocHUC2/14_Upper_Colorado_Region.html?hucFilter=14 (updated February 14, 2026).
⁶ February 2026 24-Month Study 2-Year Probabilistic Projections, Bureau of Reclamation, https://www.usbr.gov/uc/water/crsp/studies/24Month_02.pdf.
⁷ United Nations Educational, Scientific, and Cultural Organization (UNESCO), <https://whc.unesco.org/en/list/75/>.

its tributaries is integral to the health of the landscape and the Native peoples that have deep spiritual and cultural connections to the land and water in and around these canyons.⁸

We raise these ecological, spiritual, and cultural values here because this Draft EIS does not acknowledge what is at the heart of the decisions being made. While providing incredible benefits to society, the Colorado River has its own intrinsic value. These guidelines, yes, determine how to fulfill century-old promises that are no longer attainable, but also determine whether cultures persist and rivers flow.

The modeling in the Draft EIS makes clear the sacrifices that need to be made to balance water supply and demand and ensure the basin's resources can be maintained. However, despite the acknowledgement by the seven basin states that water use needs to be reduced, the states simply cannot agree how to distribute the pain. Reclamation has been unable to break the impasse. The Basin's leadership has failed to collaborate on a difficult but necessary solution.

To navigate our way out of this crisis, we need a deal that will protect the Colorado River and its resources over the short and long term. Ideally, the seven basin states (Arizona, California, Colorado, Nevada, New Mexico, Utah and Wyoming) and the federal government—with inclusion of the 30-basin tribes—will come to an agreement that: equitably shares the burden of water supply reductions; sustains the system and its resources for present and future generations; protects and maintains river flows, environmental, and cultural resources; honor the rights, sovereignty, and interests of the 30 basin tribes; protects groundwater; and prioritizes climate resilience planning for both operations and infrastructure. So far, such an agreement has been elusive, leaving the federal government to lead. The Secretary of the Interior needs to assert the full range of his authority to ensure that the system does not crash and that Reclamation's actions remain compliant with the mandate of the Grand Canyon Protection Act of 1992 to “protect, mitigate adverse impacts to, and improve” natural and cultural resources.⁹

The Trust details its comments below:

I. Reclamation's Draft EIS is inadequate under NEPA.

Reclamation's Draft EIS falls short under NEPA for three reasons: 1) the agency's foundational modeling is flawed because it does not represent the dry conditions in the basin; 2) Reclamation fails to analyze a reasonable range of technically and economically feasible alternatives, and 3) reasonably foreseeable effects of the proposed action are not assessed.

⁸ See Tribal Submissions in response to the June 16, 2023, Notice of Intent to Prepare an EIS for the Post-2026 Operational Guidelines and Strategies for Lake Powell and Lake Mead. https://www.usbr.gov/ColoradoRiverBasin/documents/post2026/scoping/Tribal_Submissions_508.pdf; see LTEMP SEIS ROD, Attachment D at 81, Pueblo of Zuni Comment Letter dated June 26, 2024 (“the lands, airs, and waters of Glen and Grand Canyons are not only culturally and ecologically significant, but sacred to and for *A:shiwi* and other Native American Tribes.”). <https://www.usbr.gov/uc/DocLibrary/EnvironmentalImpactStatements/GlenCanyonDamLong-TermExperimentalManagementPlan/20240703-GCDLTEMP-FinalSEIS-RecordofDecision-508-AMWD.pdf>

⁹ Grand Canyon Protection Act of 1992, Pub. L. No. 102-575, 106 Stat. 4600 (1992) (herein “GCPA”).

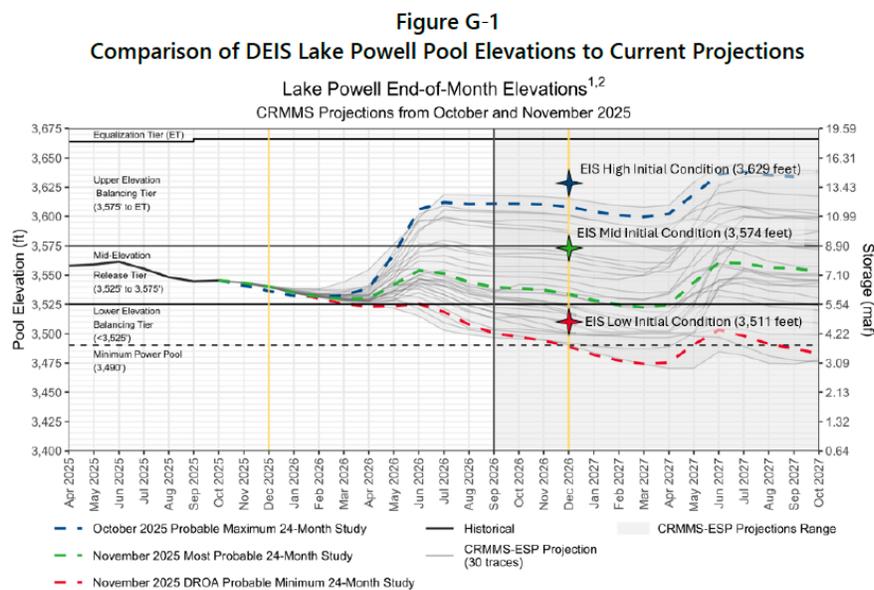
A. Reclamation's foundational modeling is flawed.

1. Reclamation significantly overestimates initial reservoir conditions at Lake Powell in December of 2026.

a) *Initial reservoir conditions must be updated in the Final EIS to reflect current conditions and to accurately evaluate the alternatives and effects on system resources.*

Reclamation overestimates the projected reservoir conditions at the start of the new guidelines in December 2026. Conditions in the basin have deteriorated significantly since the November 2024 modeling, leaving two of the three initial conditions completely outside and above the range currently projected to exist in December of 2026. This failure skews every analysis in the EIS wet, thus rendering the analysis deficient.

The agency determined initial reservoir conditions for its modeling nearly two years ago using the November 2024 CRMMS-ESP.¹⁰ Figure G-1 shows the December 2026 high, mid, and low initial conditions (blue, green, and red stars) selected for the Draft EIS analysis and compares them with the October and November 2025 projections.¹¹



Reclamation explains:

The November 2025 CRMMS-ESP ensemble shows a broad range of potential end-of-2026 elevations for Lake Powell, spanning approximately 3,490.21 to 3,615.40 feet. The DEIS Low and Mid initial conditions fall well within the ensemble, while the High initial condition is approximately 20 feet above the upper bound of the current projection range. The high bias in initial conditions is consistent with expectations given that the DEIS

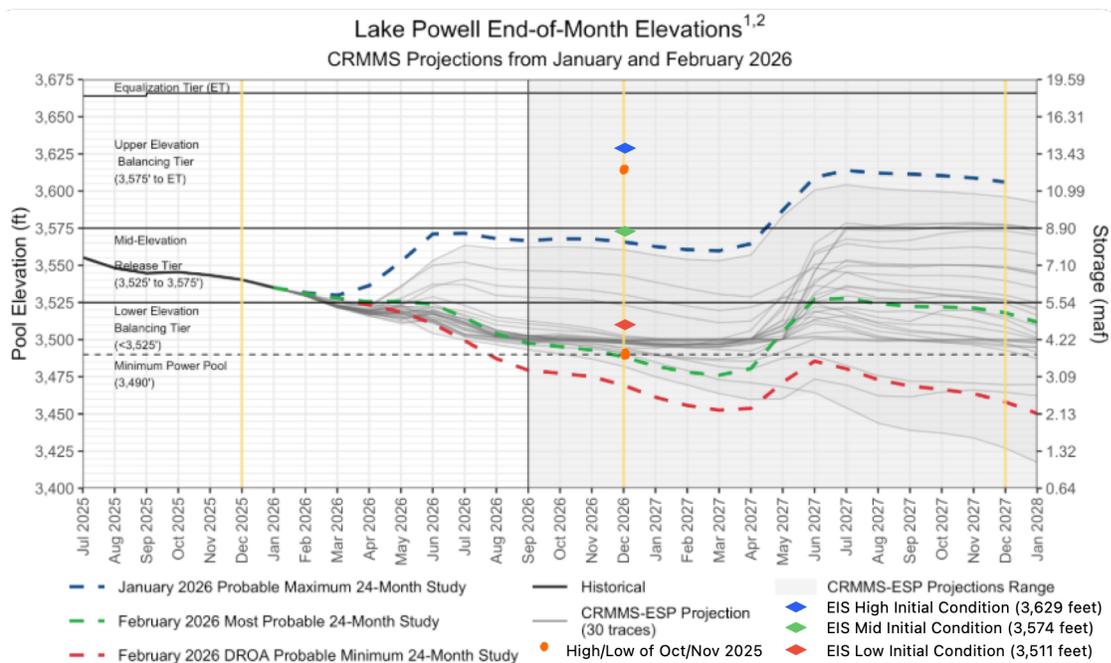
¹⁰ DEIS at Appendix G at G-1.

¹¹ *Id.* at G-3.

initial conditions were based on the November 2024 CRMMSESP ensemble, prior to the below-average WY 2025 runoff [].¹²

The agency concludes that “despite deterioration in system conditions since the DEIS initial conditions were finalized, the DEIS initial conditions **continue to span the range of plausible end-of-2026 system states** represented in the most recent CRMMS-ESP projections.”¹³ That conclusion, however, is no longer viable given the most recent 24-month projections from January and February 2026.¹⁴

These new projections are considerably lower than those made in October and November 2025.¹⁵ The figure below is Reclamation’s 2-Year Probabilistic Projections from January and February 2026. The Trust has added for demonstrative purposes three diamonds showing the high (blue), mid (green), and low (red) initial conditions, which are the same elevations identified in the Draft EIS, Figure G-1, Appendix G. Further, the Trust included two orange dots showing the Oct/Nov 2025 projected high and low range of traces from Figure G-1, reproduced above.¹⁶



The January/February 2026 high, mid, and low elevations for December 2026 are 3,565, 3,488, and 3,469 feet, respectively.¹⁷ These elevations are 64, 86, and 42 feet below the high, mid, and low initial conditions selected as the foundation of the modeling in the Draft EIS.

¹² *Id.* at G-2.

¹³ *Id.* at G-2 (Emphasis added.)

¹⁴ Bureau of Reclamation *supra* note 6.

¹⁵ *Id.*; DEIS Appendix G at G-2.

¹⁶ Jan/Feb 2026 2-Year Probabilistic Projection modified by the Trust to identify with colored diamonds the high (blue), mid (green), and low (red) initial conditions. The figure also includes orange dots to demonstrate the high and low in the range from the Oct/Nov 2025 projections. Both the diamonds and the orange dots are taken from the data identified in Figure G-1 in the DEIS Appendix G.

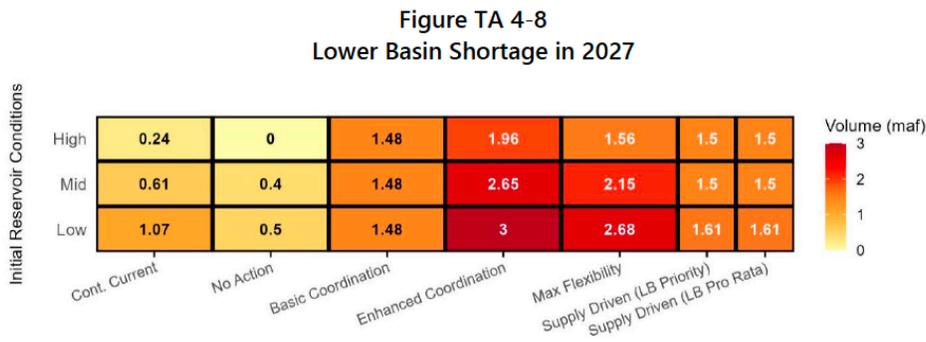
¹⁷ *Id.*; U.S. Bureau of Reclamation February 2026 24-Month Study and CRMMS Modeling Results Lake Powell – Pool Elevation January 1, 2027, https://www.usbr.gov/uc/water/hydrodata/crmms/current/2_2026/919/dashboard.html#pool_elevation/.

Further, the selected high and mid initial reservoir conditions of 3,629 feet and 3,574 feet are above the January/February 2026 high end of the range (3,565 feet). While the low initial condition (3,511 feet) still falls within the November 2025 range, it is 23 feet above the projected mid condition for January/February 2026 and 42 feet above the low condition. Thus, the November 2024 initial conditions used as the foundation for the modeling in the Draft EIS is no longer adequate to represent the starting point for the new guidelines. The reservoir levels throughout the Draft EIS were overestimated, which resulted in a flawed analysis. Reclamation must update these initial conditions based on the January and February 2026 24-month study or subsequent projections released before the agency conducts the analysis for the Final EIS.

b) Every analysis in the Draft EIS is impacted by initial reservoir elevations that are too high.

The initial reservoir conditions play a critical role in the Draft EIS's analysis and will impact the agency's decision on new guidelines, including the amount of water use reductions needed from the Lower Basin states, the contributions needed from the Upper Basin states, whether Lake Powell and Lake Mead reach critical elevations, the amount of dead pool-related reductions, how much water can be released from Glen Canyon Dam, how often high flow experiments (HFEs) can operate, and more. Overestimating initial reservoir elevations unrealistically distorts future projections for the river.

A stark example of how initial reservoir conditions can impact Lower Basin shortages can be seen in Figure TA 4-8, showing Lower Basin shortage in 2027 based on the low, mid, and high initial reservoir conditions.¹⁸



For example, in the Maximum Flexibility alternative, shortages vary between high to low initial reservoir conditions from 1.56 to 2.68 MAF (roughly 1 MAF). Due to Reclamation's overestimate of initial conditions, the 2027 Lower Basin shortage is likely to be even more than the projected 2.68 MAF. The low initial condition is going to shift up in the graph to be the new mid initial condition; thus, the low condition will likely have a higher shortage greater than 2.68 MAF. Maximum Flexibility has a maximum shortage of 4 MAF, so the low initial condition is likely to be closer to the maximum shortage. Therefore, it is unacceptable for Reclamation to proceed without ensuring that its analysis provides decision makers and the public with an accurate assessment of the effectiveness of the alternatives in sustaining the Colorado River system and its resources and to detail the risks and benefits. Reclamation needs to revisit its inflated initial reservoir conditions and revise any modeling based on those conditions before it publishes its Final EIS.

¹⁸ DEIS Figure TA 4-8 at 4-34.

c) Reclamation has historically overestimated reservoir elevations at Lake Powell in its August 24-month studies by more than 4 feet.

Modeling under the existing 2007 Interim Guidelines has long overestimated the reservoir conditions at Lake Powell.¹⁹

Between 2008 and 2019, August 24-Month Study projections of December 31 elevation at Lake Powell had a bias of +4.08 feet, indicating the projected elevations are typically higher than observations. The bias at Lake Mead for the same projection is -0.72 feet, indicating a slight tendency to project lower elevations than what occurs.

Wang et al. (2021)²⁰ also reviewed the accuracy of Reclamation's 24-month studies and concluded "[f]or all three inflow scenarios [max, most, and minimum probable], Lake Powell elevation/volume forecasts were biased high." In fact, "for the 'most probable' inflow scenario, there is more than a 75% chance for Lake Powell's actual January 1 elevation to be lower than projections made in August."²¹

Reclamation's use of an already-biased wet-24-month study with outdated initial reservoir conditions creates twice the concern about the accuracy of any analysis based on these conditions. Reclamation must update its initial reservoir conditions to reflect the most recent forecast. The analysis of the alternatives and resources also need to be updated to reflect the changed conditions. Until these updates are made, the Draft EIS does not meet the minimum requirements of NEPA.

2. Reclamation's analysis of the risks of Lake Powell falling below 3,500 feet is misleading and requires clarification.

A key analysis included in the Executive Summary of the Draft EIS is misleading and needs to be clarified in the Final EIS. Reclamation prominently places an analysis of the vulnerability of Lake Powell falling below elevation 3,500 feet in Tables ES-4 (20-year vulnerability) and ES-6 (5-year vulnerability) to show the conditions where Lake Powell falls below 3,500 feet along with the number of years that were below that historic threshold historically (2000-2024) and (1906-2024), respectively.²²

Based on the information provided in the table itself and the lack of narrative explanation, it appears that the table reports the number of individual years with annual hydrology (natural flow at Lees Ferry) that fall below the specified threshold. For example, the number of years where the annual natural flow fell below the threshold (e.g. 13.1 MAF for Basic Coordination) in the first 20 years (Table ES-4) between 2000-2024, was 15 years, not the 8 years reported. Thus, it appears that the table underreports the number of years.²³ However, after further investigation, it appears that the table is really examining

¹⁹ U.S. Bureau of Reclamation, Review of the Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead, 21 (Dec. 18, 2020), https://www.usbr.gov/ColoradoRiverBasin/documents/7d/7.D.Review_FinalReport_12-18-2020.pdf. The review concluded that "[e]ven when errors in hydrologic forecasts are relatively small, they can have large impacts on operations when reservoirs are near thresholds."

²⁰ Wang, J., Udall, B., Kuhn, E., Wheeler, K., and Schmidt, J.C., Evaluating the Accuracy of Reclamation's 24-month Study Lake Powell Projections, UTAH STATE UNIVERSITY CENTER FOR COLORADO RIVER STUDIES, White Paper No. 7 at pages 13-15 (Figure 9) (Feb. 18, 2022) <https://qanr.usu.edu/coloradoriver/files/news/White-Paper-7.pdf>.

²¹ *Id.* at 17.

²² DEIS Executive Summary at ES-23 and ES-24.

²³ For example, over the full 20-year period (Table ES-4), the Basic Coordination Alternative is vulnerable at or below 13.1 MAF. From 2000-2024, the natural flow at Lees Ferry was below 13.1 MAF in 15 years (2000, 2001, 2002, 2003, 2004, 2006, 2007, 2010, 2012, 2013, 2018, 2020, 2021, 2022, and 2024); however, the Table ES-4 only indicates 8 years.²³ Based on our review, even the Enhanced Coordination and Maximum Flexibility alternatives—shown to have fallen below the threshold from

the “Number of Years with preceding 20-year averages below threshold 2000-2024” to determine the alternatives vulnerability.

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

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

While we appreciate this analysis and the effort by Reclamation to create high level information to share with the public and decision makers, the Draft EIS (and especially the Executive Summary) need to contain enough information that you do not need to have a conversation with the modeler to understand the analysis. Most of the people reading this analysis—in the very limited and insufficient 45-day comment period—only read the Executive Summary. Even considering those that read the document cover-to-cover, very few are familiar with or have a PhD in DMDU modeling. Reclamation needs to clarify the headings and add narrative information on what Tables ES-4 and ES-6 are showing to ensure that the analysis is not misunderstood.

3. Reclamation models Upper Basin water use that is significantly higher than actual use in the basin.

Reclamation’s modeling in the Draft EIS inflates the current use by the Upper Basin and factors into the Draft EIS modeling a significant increase in Upper Basin uses over the next 20 years. Reclamation relies on the 2016 Upper Colorado River Commission’s (UCRC) demand schedule, which contemplates water use of 5.516 MAF in 2027 and an expansion of use to 6.045 MAF by 2060.²⁴ This excludes the UCRC estimated 0.520 MAF/year reservoir evaporation.²⁵

The Upper Basin is, on average, using less than what is projected for 2027. Wheeler et al. (2022) reported the 2000-2020 average was 4.4 MAF/year including reservoir evaporation.²⁶ This is consistent with the average 2021-2024 consumptive use reported by Schmidt et al. (2025) of 4.47 MAF.²⁷ The current average use without reservoir evaporation is about 3.7 MAF/year. Hence, the Upper Basin is currently using about 1.8 MAF/year less than what is being projected for use in 2027.

2000-2024 in 0 years—fall below the 9.7 and 9.0 MAF thresholds in 6 years (2002, 2004, 2012, 2013, 2018, 2021) and 4 years (2002, 2012, 2018, 2021), respectively. The table requires a clearer explanation of what it is showing and what years were below the threshold and why. It is not intuitive that the table uses a single year to represent the 20-year rolling average.

²⁴ See DEIS Appendix L, Table L-1, 2016 Upper Division States Depletion Demand Schedule at L-1 to L-3.

²⁵ The UCRC demand schedule does not include Upper Basin reservoir evaporation, which it averages 0.52 MAF/year. Footnote 2 in the DEIS, Appendix L at L-1 provides “Neither the CRSS baseline demands nor the UCRC 2016 Depletion Demand Schedule include reservoir evaporation undistributed by state from Lake Powell, Flaming Gorge, Blue Mesa, Morrow Point, which averages 520.0 maf per year.” There appears to be a typo, it should read “0.520 maf per year.” The FEIS should be revised to reflect this mistake.

²⁶ Wheeler et al. (2022), *supra* note 3 at 373-375 (“Between 2000 and 2020, Upper Basin consumptive uses averaged 3.7 MAF/year plus at least 0.7 MAF/year of reservoir evaporation.”).

²⁷ Schmidt, J., Castle, A., Fleck, J., Kuhn, E., Sorensen, K., Tara, K., Analysis of Colorado River Basin Storage Suggests Need for Immediate Action, GETCHES-WILKINSON CENTER, UNIVERSITY OF COLORADO BOULDER, (Sept. 11, 2025) <https://www.colorado.edu/center/gwc/media/670>. This estimate includes estimated reservoir evaporation at Lake Powell.

This is significant for Reclamation's modeling. First, if water use is estimated to be 5.5 MAF and actual use is more like 3.7 MAF, that means there is 1.8 MAF less water being consumed than is assumed in the modeling. This unused Upper Basin water serves as a buffer to resource impacts. That unused water may likely be unused tribal water that could be accounted for, stored, and/or compensated for its non-use. The opposite, however, could also be true. If Upper Basin uses track with the schedule and increase by ~2 MAF in the next 20 years, that essentially offsets shortages taken in the Lower Basin (e.g. 1.48 MAF under Basic Coordination) and would lead to a net increase in water use in the basin rather than the net decrease that is needed to meet the water supply reductions the basin is experiencing.

We appreciate Reclamation's sensitivity analysis in Appendix I to weigh the effects of alternate Upper Basin demand scenarios.²⁸ Reclamation concludes that all alternatives (except Supply Driven) reflect the general trend showing "lower steady-state demand scenarios result in higher Lake Powell elevations, higher compact point 10-year flows, higher Lake Mead elevations and lower total shortages than higher steady-state demand scenarios."²⁹ Further, the "steady state 4.5 maf scenario was the most robust ... at maintaining Lake Powell above 3,500 feet and Lake Mead above 975 feet."³⁰ Thus, reducing or holding Upper Basin consumptive use to a steady-state demand has a notable benefit for system stability and resources.

Despite this analysis, Reclamation has not gone far enough to analyze the role Upper Basin reductions play in stabilizing reservoir storage in the Colorado River system. Even if solutions can keep reservoirs above critical elevations in the near-term (and there is little evidence that they will), the basin's water supply is predicted to continue to constrict 20-30% by midcentury and 35-50% at the end of the century.³¹

Reclamation's analysis fails to weigh the tradeoffs of Upper Basin expansion of use and the Lower Basin shortages on a system-wide basis. Wheeler et al. (2022) provides a figure that allows comparison of the Upper Basin consumptive use that could be paired with Lower Basin shortages to stabilize Lake Powell and Lake Mead above critical elevations.³²

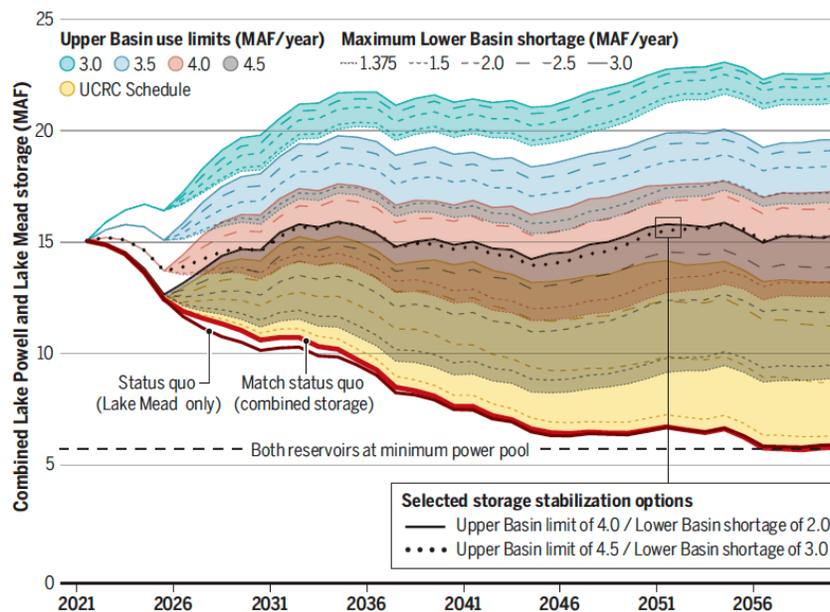
²⁸ See DEIS Figure I-1 at I-3.

²⁹ *Id.* at Appendix I at I-7.

³⁰ *Id.* at Appendix I at I-18.

³¹ Udall, B., and J. Overpeck, *The twenty-first century Colorado River hot drought and implications for the future*, 53 WATER RESOURCES RESEARCH, Figure 2 at 2406, (Feb. 17, 2017), <https://doi.org/10.1002/2016WR019638>.

³² Wheeler et al. (2022), *supra* note 3 at 374.



This analysis is helpful to understand the role of Upper Basin contributions (voluntary or otherwise) to sustaining the health and stability of the Colorado River Basin. Net water demand reductions in the basin (whether taken as a shortage in the Lower Basin or contribution by the Upper Basin) is what will help balance supply and demand in a way that can protect reservoir elevations and make water available for system resources. We believe Reclamation should consider a similar analysis and/or should carry forward its sensitivity analysis into an alternative in the Final EIS. One strategy is to temporarily hold Upper Basin use to a certain level at times when higher Lower Basin shortages are required and when necessary to rebuild reservoir storage above critical elevations.

4. Reclamation overestimates the number of high-flow experiments by assuming they automatically occur when Lake Powell is above 3,500 feet.

As authorized by the revised HFE protocol in the 2024 SEIS for the Long-Term Experimental and Management Plan (LTEMP), high-flow experiments can only occur if Lake Powell elevations are above 3,500 feet.³³ Reclamation’s modeling assumes that any time Lake Powell is above 3,500 feet a HFE will be implemented provided other sediment-related conditions are met. However, “in practice, fall HFEs have not been implemented when Lake Powell water levels were below 3590 feet” and only one spring HFE occurred at elevation 3,523 feet in April 2023 (it was scheduled based on the large water year 2023 runoff).³⁴ Reclamation admits that its “modeling overestimates the number or frequency of HFEs.”³⁵

HFEs play a huge role in mitigating impacts to resources in the Grand Canyon by building sandbars that are important for supporting natural ecological processes, fish and wildlife habitat, and providing wind-blown sand to protect archaeological sites, just to name a few of the benefits. This overestimate of HFEs obfuscates the effects that may come to fruition if HFEs don’t, in practice, occur as frequently as the modeling estimates. Reclamation should change the threshold for HFEs to 3,525 feet, based on the historic practice as it has done for other metrics in this analysis.

³³ U.S. Bureau of Reclamation. Glen Canyon Dam Long-Term Experimental and Management Plan Final SEIS (2024) at 2-7 (“it is assumed that no HFE releases would be implemented below a Lake Powell elevation of 3,500 feet”).

³⁴ DEIS at 5-9.

³⁵ *Id.*

B. Reclamation failed to analyze a reasonable range of technically and economically feasible alternatives.

NEPA requires all agencies of the federal government to prepare a “detailed statement” evaluating all “major federal actions significantly affecting the quality of the human environment.”³⁶ The Environmental Impact Statement (“EIS”) is required to study a reasonable range of alternatives to the proposed action, which must be technically and economically feasible, including a no action alternative.³⁷ The description of alternatives is considered the “heart” of an EIS.³⁸ An agency’s consideration of alternatives serves the twin purposes of fostering informed decision making and public participation.³⁹ The existence of reasonable but unexamined alternatives renders an EIS inadequate.⁴⁰

We appreciate the agency’s work to explore a range of alternatives in a landscape that is uncertain and constantly evolving. The options analyzed provide a sense of what actions it will take to bring the basin back into balance. We hoped that the basin states could reach an agreement about key parameters of the new guidelines, particularly what significant water use reductions could be achieved and how those reductions would be distributed. We also anticipated that some of the creative tools analyzed in this Draft EIS could be implemented to provide flexibility in the system. Unfortunately, that won’t be possible because the basin states have yet to reach a deal.

1. Three of the five alternatives are not technically or economically feasible without a consensus agreement among the states.

The states’ failure to reach a deal renders three of the five alternatives technically and economically infeasible. The Enhanced Coordination, Maximum Flexibility, and Supply Driven alternatives all include elements that require agreement between the states and likely also new authority or investments from Congress. Without new legal authority, these three alternatives are not feasible. Thus, because the only legally feasible alternatives are the Basic Coordination and No Action⁴¹ alternatives, the Draft EIS does not provide an adequate range of alternatives.

We don’t envy Reclamation having to decide how to proceed without agreement between the states and without Congress to help facilitate such a deal. Reclamation will need to carefully evaluate its authorities, weigh the risks, and determine the actions it can and must take to ensure at least the near-term stabilization of Lake Powell and Lake Mead and protect the communities and resources that depend on the river. This will be a tenuous line to walk, to say the least. However, it is likely that whichever option Reclamation chooses or creates will end up in litigation given the chasm between the states as to how to manage the basin. Thus, Reclamation should take action to ensure the sustainability of the Colorado River Basin and put forth a bold plan to bridge the gap while hopefully encouraging the states to create something better.

³⁶ 42 U.S.C. § 4332(2)(C).

³⁷ *Id.* at § 4332(2)(C)(iii).

³⁸ *City of Alexandria v. Slater*, 198 F.3d 862, 866 (D.C. Cir. 1999).

³⁹ *California v. Block*, 690 F.2d 753, 767 (9th Cir. 1982).

⁴⁰ *Friends of Southeast’s Future Case v. Morrison*, 153 F.3d 1059, 1065 (9th Cir. 1998).

⁴¹ The No Action alternative does not meet the purpose and need of the proposed action. For example, under dry conditions, the No Action alternative only is sufficient at keeping both Lake Powell and Lake Mead above critical elevations (3,500 and 975 feet) in 43 and 35 percent of futures, respectively and performs in only about 15 percent of futures in critically dry conditions. This is not a viable future for the basin.

2. The Basic Coordination alternative is not robust enough to ensure “the sustainable management of the Colorado River system and its resources.”

The Basic Coordination alternative was developed “to provide a compliance option for a specific set of operations that could be implemented in 2027 if no new agreements among Basin water users are adopted.”⁴² Reclamation recognizes that this alternative “may not provide adequate protection of critical infrastructure or the system and may be viable only in the short term given current reservoir conditions.”⁴³ However, this alternative or something similar may be the only option given that no agreement between the states or approvals from Congress appear to be possible.

The Basic Coordination alternative does not meet the commitment in the federal action “to provide for the sustainable management of the Colorado River system and its resources under a wide range of potential future system conditions.”⁴⁴ If Reclamation wants to create an alternative that could serve as a bridge to a consensus agreement between the states or a court-ordered version of a new plan, this alternative needs to be made more robust or it will fail out of the gate, given the dry hydrology predicted over the next 24 months. The term of this alternative should also be carefully weighed (e.g. 2-year, 5-year or 10-year plan); Reclamation should provide a bridge but still incentivize a more comprehensive and durable consensus agreement for the long-term.

a) The level of water use reductions is not adequate to balance water supply and demand and rebuild storage above critical elevations.

The Basic Coordination alternative fails to keep Lake Powell above critical elevations for the full 20-year modeling period. For example, in two-thirds of the modeled futures, Lake Powell falls below 3,490 feet some month during the year.⁴⁵ Further, the alternative is vulnerable at flows in conditions like the 2002-2021 20-year average of 12.5 MAF.⁴⁶ The alternative has an even harder time keeping Lake Powell above 3,500 feet—it only maintains water levels above that elevation in a quarter of months.⁴⁷ It is also quite vulnerable to dropping below 3,500 feet when the 10-year average is below 11.7 MAF, which is close to the driest 10-year average from 2012-2021 of 11.8 MAF.⁴⁸ This failure can be attributed at least partly to the modest Lower Basin shortages of 1.48 MAF and the lack of Upper Basin contributions to reduce water use in the basin.

Other alternatives with higher water use reductions across the basin demonstrate what would be needed to stabilize reservoir levels. The Enhanced Coordination and Maximum Flexibility alternatives—allocating shortages of up to 3 and 4 MAF for the Lower Basin and requiring 350-500 KAF per year in Upper Basin conservation—do much better at keeping Lake Powell above critical elevations. These alternatives perform to keep Lake Powell above 3,500 feet in 100% of months in 82% and 87% of futures

⁴² DEIS at 2-2.

⁴³ *Id.* at 2-11.

⁴⁴ *Id.* at 1-4.

⁴⁵ *Id.* at Figure TA 15-9 at 15-23.

⁴⁶ *Id.* at Figure TA 15-10 at 15-24.

⁴⁷ Lake Powell elevation 3,500 feet is significant because at that elevation it becomes increasingly difficult for the Secretary of the Interior to meet the mandate of the GCPA to “protect, mitigate adverse impacts to, and improve” the values for which Grand Canyon National Park and Glen Canyon National Recreation Area were established. Below 3,500 feet, HFEs cannot be implemented according to the 2024 LTEMP SEIS, which is a key mechanism to mitigate impacts to cultural and ecological resources in the Grand Canyon.

⁴⁸ DEIS Figure TA 3-7 at 3-26 and Table TA 3-8 at 3-27.

and protect against minimum power pool (3,490 feet) in 86% and 95% of futures.⁴⁹ There is a tradeoff here of higher water use reductions to protect basin reservoir levels.⁵⁰

Reclamation should consider and model increasing the volume of shortage reductions for this alternative above 1.48 MAF and/or requiring Upper Basin contributions (e.g. temporary hold or steady-state water use) until a deal is reached. Water use reductions greater than the 1.48 MAF were proposed in the NEPA process for the 2024 Near-Term SEIS and ROD including: Reclamation's Alternative 1 and 2 with reductions of 2.083 and 4 MAF; 6 of the 7 basin states (not including California) proposed reductions of 2.743 MAF; and California went it alone to propose cuts of 3.05 MAF. These reductions are significantly more than those being considered by the states in recent proposals and reflect a back-walking toward litigation positions rather than negotiations for the benefit of the basin.

The other consideration is the term of the increased reductions. While the robustness of the alternative at 3,490 feet over the next 10 years was not analyzed in the Draft EIS, Reclamation did look at the robustness of 3,500 feet from 2027-2039.⁵¹ The Basic Coordination alternative does keep Lake Powell above 3,500 feet in nearly half (48%) of futures over this shorter period.⁵² Reclamation should analyze the next 5 and 10 years with updated initial reservoir conditions to see how vulnerable Lake Powell and Lake Mead are to falling to or below critical elevations over the short term and adjust the shortages accordingly. This full evaluation should be conducted at elevations 3,490 feet, 3,500 feet and 3,525 feet at a minimum for Lake Powell using the same robustness thresholds.⁵³

b) Basic Coordination maintains high releases from Glen Canyon Dam, resulting in the highest river flows through Grand Canyon, but that may come at the expense of lower Lake Powell water levels and forced limited releases when water is unavailable.

Basic Coordination prioritizes higher river flows in Grand Canyon rather than limited releases to preserve Lake Powell water levels. As a result, this alternative generally meets the minimum flow guidelines in the 2016 Long-Term Experimental and Management Plan (LTEMP). For example, Basic Coordination meets or exceeds the 5,000 cubic feet per second (CFS) threshold every day in 80% of futures and exceeds 8,000 CFS threshold in 95% of days in 81% of futures.⁵⁴ The Supply Driven alternative is the only alternative that performs better in both scenarios.

However, when sustained Glen Canyon Dam releases are too high, those releases become drastically reduced when critical dry conditions are experienced. For example, Reclamation's modeling shows median releases for Basic Coordination range from 9.5 MAF in wet conditions, 8.23 MAF in average conditions, and 6.82 MAF in critically dry conditions. Based on the range of releases (9.5 to 7 MAF) specified in the alternative, it is unclear why shortages fall below 7 MAF in critically dry conditions. It appears those reductions may be forced to preserve Lake Powell elevations or due to

⁴⁹ DEIS Figure TA 3-7 at 3-26 and Figure TA 15-9 at 15-23.

⁵⁰ Another important consideration is how those shortages are triggered—Lake Mead elevations are much less tied to the hydrology of the basin. The simplest trigger may be to use the combined storage of Lake Powell and Lake Mead on October 1 at the start of each water year.

⁵¹ DEIS Figure TA 3-7 at 3-26.

⁵² *Id.* However, caution should be taken given the very high initial reservoir conditions that were factored into these elevations.

⁵³ Reclamation's DMDU robustness analysis does not always compare things in a way that allows the reader to compare across metrics in a way that is apples-to-apples. For example, Reclamation chooses 100% as the threshold for its robustness analysis of keeping Lake Powell above 3,490 feet and 3,500 feet but drops that to 90% of years for elevation 3,525 feet and 80% of years for elevation 3,570 feet. We understand the reasoning for the judgments made, but it makes it incredibly difficult to compare across analyses. It is apparent from the heat map that at 100% of years some of the metrics are not being met, but knowing the percentages would be informative all the same.

⁵⁴ DEIS Figure TA 14-5 at 14-23 and Figure TA 14-6 at 14-24.

infrastructure constraints affecting releases. Reclamation should specify the impetus for these reductions in very dry years.

Under critically dry conditions (< 10 MAF), 75% of modeling traces have releases less than 7.6 MAF—falling to 5.59 MAF in the 25th percentile, 4.66 MAF in the 10th percentile, and the minimum would be a 2.42 MAF release. Below the 25th percentile (4.66 MAF), releases would no longer meet the LTEMP minimum flow requirements in Grand Canyon. Other alternatives (e.g. Enhanced Coordination and Maximum Flexibility) reduce Glen Canyon Dam releases before hydrology reaches critically dry conditions, which spreads out the reductions.

Reducing water releases from Glen Canyon Dam is a key strategy for increasing or stabilizing Lake Powell reservoir elevations; however, that comes at the expense of flows in Grand Canyon. Reclamation should assess this tradeoff carefully to protect Grand Canyon flows and resources as required by the GCPA, but not at the expense of forced drastic reductions in flow because releases have been too high for too long.

c) Basic Coordination relies too heavily on upstream CRSP reservoir releases to ensure Lake Powell does not fall to critical reservoir elevations.

Due to its modest shortages, the Basic Coordination alternative depends on Lake Powell Infrastructure Protection (“PIP”) releases from the CRSP initial units (Flaming Gorge, Blue Mesa, and Navajo reservoirs) to keep Lake Powell elevations above critical elevations. PIP releases are triggered when elevations fall to 3,525 feet. Over the full 20-year period, Reclamation’s modeling indicates that this alternative keeps Lake Powell above 3,525 in 90% of months in 40% of futures; that percentage increases to 54% of futures for the 2027-2039 period.⁵⁵ However, this means Lake Powell is projected to fall below 3,525 feet in two-thirds (60%) of futures—triggering PIP releases.

The volume and frequency of such releases are not insignificant, especially when conditions are critically dry (<10 MAF).⁵⁶ PIP releases under Basic Coordination could be as high as 1.1 MAF, but 90 percent of releases would be about 600,000 AF under extremely dry conditions. It should be noted that this volume of releases is well above what was implemented in 2022 when Lake Powell fell to 3,519 feet. More significantly, these releases would occur in 63% of futures when conditions are critically dry.⁵⁷ These releases, however, are also triggered in moderately wet, average, and dry conditions in about 10%, 30%, and 60% of futures, respectively.⁵⁸

Thus, under the Basic Coordination alternative, PIP releases are a key strategy used to protect Lake Powell from reaching critical water levels. This may not be a sustainable strategy unless Reclamation can show that there would be water available in upstream reservoirs to satisfy the volume and frequency of releases and that the upstream reservoirs could recover storage based on the future hydrology. A discussion of this deficiency in the Draft EIS is in *Section I.C.3.b*, below.

The strategy of using upstream reservoir releases to prop up Lake Powell water levels in critically dry water years (or series of years) should be available in the new guidelines. However, if triggered too frequently or if releases become too large, it becomes a liability to sustainable management.

⁵⁵ DEIS Figure TA 3-9 at 3-28.

⁵⁶ See Appendix O, Figure O-1 at O-3 and Figure O-2 at O-4.

⁵⁷ *Id.*

⁵⁸ See Figure O-2 at O-4.

d) *Basic Coordination needs to be more robust to protect and mitigate impacts to Grand Canyon environmental and cultural resources.*

(1) *This alternative fails to keep Lake Powell above 3,570 feet to prevent the passage of nonnative fish through Glen Canyon Dam.*

Basic Coordination does not perform well under several key metrics to protect Grand Canyon flows and resources. For example, Basic Coordination does not perform well at keeping Lake Powell above 3,570 feet, which is the elevation where entrainment of nonnative fish through Glen Canyon Dam is low and water temperatures are typically colder. “Maintaining reservoir elevations above 3,570 feet at the start of the year, or above 3,600 feet, is predicted to substantially reduce the risk of smallmouth bass and other nonnative species [passing through Glen Canyon Dam and] entering downstream habitats.”⁵⁹

The alternative only maintains Lake Powell above this elevation in about 20% of futures in 100% of years⁶⁰ and fails to keep Lake Powell at or above 3,570 feet in 20% of years when a 20-year average is below 12.5 MAF.⁶¹ The driest observed 20-year average (2002-2021) was 12.5 MAF, making this alternative vulnerable under recent conditions.⁶²

The Maximum Flexibility and Enhanced Coordination alternatives are both more robust and perform better at meeting this metric due to higher Lower Basin shortages, Upper Basin contributions, and lower Glen Canyon Dam releases, among other factors. Essentially, these alternatives accomplish this by keeping Lake Powell elevations higher. To improve performance of the preferred alternative under this metric, additional water use reductions above 1.48 MAF and lower releases from Lake Powell will likely be required.

(2) *The alternative fails to prevent reproduction and population growth of nonnative smallmouth bass below Glen Canyon Dam.*

The success of smallmouth bass in the Colorado River below Glen Canyon Dam will depend primarily on river temperatures, which governs reproduction.⁶³ “To keep smallmouth bass population growth declining, lambda values would need to remain below 1.”⁶⁴ Lambda shows population growth in smallmouth and is calculated based on predicted water temperatures.⁶⁵

Basic Coordination does not perform well—is successful in only 25% of futures—at keeping the 5-year smallmouth bass growth rate at Lees Ferry of less than 1, which indicates a declining population of smallmouth bass.⁶⁶ The Enhanced Coordination and Maximum Flexibility options perform at 69% and 57% of futures and are less vulnerable, requiring a 10-year average below 10.7 MAF and 10.9 MAF,

⁵⁹ DEIS at 3-93.

⁶⁰ DEIS Figure TA 8-7 at 8-46. By changing the percent of years for each metric, Reclamation makes it difficult to compare the robustness analysis across metrics. For example, Table TA 8-7 provides the percent of futures that keep October 1 elevation of Lake Powell above 3,570 feet in 80% of years. If you look the row that indicates 100% of years, the performance by all alternatives is less than 50% of futures.

⁶¹ DEIS Figure TA 8-8 at 8-47.

⁶² *Id.*

⁶³ D.E. Eppheimer et al., *Declining reservoir elevations following a two-decade drought increase water temperatures and non-native fish passage facilitating a downstream invasion* 82 CAN. J. FISHERIES AND AQUATIC SCI., 17 (2025), <https://doi.org/10.1139/cjfas-2024-0187>.

⁶⁴ DEIS Technical Appendix 8 at 8-66.

⁶⁵ See Eppheimer et al. (2025), *supra* note 62.

⁶⁶ DEIS Figure TA 8-21 at 8-68.

respectively, to fail.⁶⁷ Basic Coordination is vulnerable at a Lees Ferry 10-year average of 11.6 MAF, which is just under the driest 10-year average from 2012-2021 of 11.8 MAF.⁶⁸

To keep smallmouth bass growth declining, Lake Powell elevations would have to be kept higher to maintain cooler releases. The other alternative and short-term tool is to release water from both the penstocks and outlet tubes to provide cool mix flows into the canyons below the dam. This was authorized by the 2024 LTEMP SEIS through 2027 as interim solution.

(3) The alternative fails to keep Lake Powell above 3,523 feet in November or April to allow High Flow Experiments.

High flow experiments (or controlled floods through Grand Canyon) are vital to maintaining and improving cultural and ecological resources below Glen Canyon Dam. Since the dam was constructed in 1963, HFEs are the only mechanism to transport sediment through the canyons essential for beach building. The duration and frequency of HFEs need to be maintained to protect, mitigate adverse impacts to, and improve resources in the Grand Canyon as required by the Grand Canyon Protection Act.⁶⁹

Basic Coordination only keeps Lake Powell above 3,523 feet (the lowest elevation at which an HFE occurred historically) every year in 20% of futures over the full modeling period.⁷⁰ The alternative performs about twice as well in 42% of futures when only considering the next 10 years (2027-2039).⁷¹ The Enhanced Coordination alternative performs much better over the full modeling period in 63% of futures and jumps to 71% of futures over the 10-year period.⁷² It does this by keeping Lake Powell at higher elevations (through water use reduction and lowering Glen Canyon Dam releases), among other things.

(4) The alternative fails to maintain sand mass in Grand Canyon due to high monthly releases.

Historically, the Colorado River in Grand Canyon had an abundant and renewable source of sediment from the upper portion of the basin. “Glen Canyon Dam effectively cut off approximately 95 percent of the historical sediment supply from the upper watershed.”⁷³ Since the dam was closed in 1963, at least 28 million metric tons of sand has eroded and about half of that eroded in the late 1990s, including six metric tons from each Marble and Grand Canyons.⁷⁴ Therefore, maintaining and redistributing the sand that is left in Grand Canyon or that is deposited from tributary floods from the Paria and Little Colorado Rivers is vital the health of the Grand Canyon’s resources.

In addition to conducting HFEs, there is a need to preserve sand mass in the canyons by ensuring that base flows are not so high that they unnecessarily erode sand outside of intentional high flow events. Glen Canyon Dam releases below 900,000 AF over a month (approximately 15,000 CFS) are considered non-erosive, meaning such flows do not erode sand outside of HFEs.⁷⁵ Basic Coordination is not robust at keeping maximum monthly releases from Glen Canyon Dam below 900,000 acre-feet—performing at

⁶⁷ *Id.*; DEIS Figure TA 8-22 at 8-69.

⁶⁸ *Id.* at Figure TA 8-22 at 8-69.

⁶⁹ GCPA, *supra* note 9.

⁷⁰ DEIS Figure TA 5-3 at 5-12.

⁷¹ *Id.*

⁷² *Id.*

⁷³ DEIS at 5-1.

⁷⁴ Topping, D. J., Grams, P.E., Griffiths, R.E., Dean, D.J., Wright, S.A., & Unema, J.A., *Self-limitation of sand storage in a bedrock-canyon river arising from the interaction of flow and grain size*, 126 JOURNAL OF GEOPHYSICAL RESEARCH: EARTH SURFACE, at e2020JF005565 (Dec. 16, 2020), <https://doi.org/10.1029/2020JF005565> (updated May 6, 2022).

⁷⁵ DEIS Technical Appendix 5 at 5-15.

better than 90 percent in only 28% of futures.⁷⁶ Enhanced Coordination again outperforms all the other alternatives performing in 59% of futures. It includes lower releases annually and spreads volumes out over months.⁷⁷

Reclamation's modeling also shows the conditions that could cause monthly releases to exceed 900,000 AF in more than 10% of years.⁷⁸ Basic Coordination is vulnerable to when the 10-year Lees Ferry average exceeds 13.8 MAF; "[a]bout 75 percent of futures in the reference hydrology experience 10-year average greater than these values."⁷⁹

3. Reclamation's preferred alternative should incorporate the following operational elements and prioritize these sustainability goals.

We understand that Reclamation likely needs to unilaterally build an alternative that can operate until a consensus agreement is reached or while litigation is ongoing between the states. It is clear from the Draft EIS that to protect critical reservoir elevations and ensure opportunities to maintain and improve the health of the Colorado River and its resources, an alternative must include:

- *Shortage Guidelines*—Water use reductions that are in the range of 2 to 4 MAF. The Lower Basin cannot shoulder these reductions on its own and will need the Upper Basin to contribute. Further, Upper Basin expansion of water use needs to be carefully considered or it will offset savings made and result in a net increase in basin water use.
- *Coordinated Reservoir Operations*—Reduction of Lake Powell releases (below 7 MAF) in certain years will be necessary to protect reservoir elevations and ensure that releases through Grand Canyon are not forced to dangerously low levels or lose variability. The pre-dam Colorado River was highly variable and experienced very high and very low flows. Reclamation should conduct an analysis of pre-dam flows and see if that understanding could inform when and how low and high flows should be experienced.
- *Mechanism for Storage/Delivery of Conserved Water*—A conservation pool in both Lakes Powell and Lake Mead has many advantages, including incentivizing conservation, honoring and compensating the tribes for unused water, and ensuring that Grand Canyon operations provide the most benefit with the ability to account for necessary variations in the releases between the two reservoirs. A state agreement and Congressional approval may be needed to get this across the finish line, so the Final EIS should look at ways to incentivize a deal that advances this mechanism/concept.
- *Water Releases from CRSP Reservoirs*—The ability to release water from upstream reservoirs is an important tool to address critically dry hydrology, but these releases should not be part of the normal operation in a dry or average year. Such operations should be a relatively rare occurrence if we are balancing supply and demand and keeping reservoirs above critical thresholds.
- *Environmental Goals and Priorities*— In order to accomplish the following objectives in the near-term, Reclamation must maintain Lake Powell above 3,525 feet and prioritize elevations at least 3,570 feet. Low Lake Powell elevations from 3,490 feet to 3,525 feet create a suite of consequences for environmental and cultural resources in the Grand Canyon. For example, it compromises the ability to:
 - Build and maintain sandbars key to protecting recreational, aquatic, and cultural resources via frequent HFEs

⁷⁶ *Id.* at Figure TA 5-5 at 5-15.

⁷⁷ *Id.*

⁷⁸ *Id.* at Figure TA 5-6 at 5-16.

⁷⁹ *Id.* at Technical Appendix 5 at 5-17.

- Maintain water temperatures that will support survival and recovery of humpback chub and other native fish while discouraging reproduction and expansion of populations of nonnative fish like smallmouth bass
- Ensure water is available to create variable high and low flows in the canyons below Glen Canyon Dam to support vegetation and wildlife
- Ensure nonnative fish do not pass through Glen Canyon Dam and enter the Colorado River below or pass through natural barriers that prevent upstream movement between the Colorado River and Lake Mead

We recommend that Reclamation analyze a new range of alternatives in the Final EIS on a 2-, 5- and 10-year time horizon.

C. Reclamation failed to take a hard look at the direct, indirect, and cumulative effects of the alternatives.

NEPA requires all agencies of the federal government to prepare a “detailed statement” evaluating all “major federal actions significantly affecting the quality of the human environment.”⁸⁰ This Environmental Impact Statement must analyze and describe the “reasonably foreseeable environmental effects” of the proposed action.⁸¹ In taking this required “hard look” at the proposed action’s environmental consequences, the government must “ensure the professional integrity, including scientific integrity, of the discussion and analysis in an environmental document” and “make use of reliable data and resources.”⁸²

1. Reclamation does not take a hard look at the reasonably foreseeable environmental effects of Lake Powell falling below minimum power pool elevation of 3,490 feet.

One of the key themes of this Draft EIS is how and whether changes in operations can keep Lake Powell above critical reservoir elevations.⁸³ Reclamation anchors this need for such operations on the fact that

Glen Canyon Dam was not envisioned to operate below minimum power pool (elevation 3,490 feet). Below this elevation, water cannot be released through the penstocks and must instead be released through the jet tubes at the end of the river outlet works. Infrastructure concerns associated with extended operations through the river outlet works include damage to the outlet works pipes at low reservoir elevations, erosion at the downstream base of the dam from outlet works operation, and the potential for additional unknown issues from operating the outlet works for extended periods. Any one of these factors could compromise the safety and stability of Glen Canyon Dam and affect the ability to meet critical downstream water supply needs.⁸⁴

Reclamation assumes that the new guidelines—through allocated shortages, reduced releases from Glen Canyon Dam, and supplementation from upstream reservoirs—will keep Lake Powell above 3,490 feet for the duration of the modeling period. However, Reclamation’s short-term 24-month

⁸⁰ 42 U.S.C. § 4332(2)(C).

⁸¹ *Id.*

⁸² *Id.* at § 4332(2)(D)–(E); *Baltimore Gas & Elec. Co. v. Nat. Res. Def. Council, Inc.*, 462 U.S. 87, 97 (1983).

⁸³ DEIS at 1-1. Reclamation “proposes adoption of new guidelines and coordinated management strategies to address Lake Powell and Lake Mead through their full operating range to take effect when the current agreements expire in 2026. Management strategies will primarily focus on the operation of Glen Canyon Dam and Hoover Dam but may include actions upstream and downstream of these facilities to protect critical reservoir elevations.”

⁸⁴ *Id.* at 1-22.

forecasting and its long-term Draft EIS modeling⁸⁵ both indicate that it is reasonably foreseeable, and in fact, likely inevitable that Lake Powell falls below minimum power pool (3,490 feet) in the next five years and certainly over the long-term.⁸⁶ Further support for this assessment is provided in a study by Wang et al. (2024) concluding “[d]ue to projected streamflow declines, under existing policy, both reservoirs will face substantial risks (>80% likelihood) of reaching dead pool before 2060. Adopting recently proposed alternative policies reduce but doesn’t eliminate such risks.”⁸⁷ Given that Lake Powell falling below power pool is a reasonably foreseeable effect of the proposed action, Reclamation must analyze the impacts of Lake Powell falling below 3,490 feet.

a) *Reclamation does not analyze the effect of no HFEs below 3,490 feet on resources in the Grand Canyon.*

One important consequence of Lake Powell falling below minimum power pool is that HFEs are no longer possible. HFEs require the use of a combination of the eight hydropower penstocks and the four river outlet tubes in Glen Canyon Dam to generate high enough flows to transport sediment through the Grand Canyon. High flow “releases of 37,000 cfs or greater are necessary for sandbar deposition.”⁸⁸ HFEs are the only mechanism available to build sandbars in the canyons below the dam and are “the most important tool for sediment resources.”⁸⁹

The Draft EIS analyzes the likelihood of HFEs occurring above 3,500 feet and the benefits they provide to rebuilding sandbars, which play a key role in “ecological, cultural, and recreational functions, supporting habitat, vegetation, archaeological resource protection, and camping areas along the river.”⁹⁰ However, Reclamation does not analyze the negative environmental impacts of no HFEs when Lake Powell elevations fall below 3,500 feet and when they become physically impossible at 3,490 feet.

We know that without HFEs, the Grand Canyon will enter a state of constant erosion with no mechanism to transport sediment or build sandbars, eliminating an important natural process of the Colorado River. Before the dam was built, floods would rebuild sandbars annually.⁹¹ Scientists have shown that when HFEs are conducted frequently (e.g. five HFEs implemented between 2012 and 2018), sandbars are restored and notable improvements are made to river resources.⁹² However, when no controlled floods were implemented (e.g. 2018 to 2023), sandbars eroded and the condition of campsites, aquatic and riparian habitat, and cultural resources deteriorated.⁹³ The April 2023 HFE, due to high levels of sand accumulation in the interim period, “resulted in deposition at all sandbar types and at sites in both Marble Canyon and Grand Canyon.”⁹⁴ These results improved on prior 2012-2018 HFEs “and reversed the trend of eroding sandbars that occurred during the 2019-2022 period that HFEs were not

⁸⁵ *Id.* at Figure TA 15-9 at 15-23.

⁸⁶ See section I.B.2., above, about the ability of the Basic Coordination alternative keeping Lake Powell above 3,490 feet. The Maximum Flexibility and Enhanced Coordination alternatives are not technically and economically feasible without an agreement between the states and the remaining alternatives do not keep Lake Powell above 3,490 feet in at least 50% of futures.

⁸⁷ Wang, B., B. Bass, A. Hall, S. Rahimi, and L. Huang, *Disentangling climate and policy uncertainties for the Colorado River post-2026 operations*, Nature Communications, 16(1):8625, (Sept. 29, 2025), <https://doi.org/10.1038/s41467-025-63635-4>. This study looks a dead pool elevation for Lake Powell (3,370 feet) and Lake Mead (895 feet); not minimum power elevations.

⁸⁸ DEIS Technical Appendix 5 at 5-2.

⁸⁹ *Id.* at 5-1.

⁹⁰ *Id.* at 3-60.

⁹¹ Paul E. Grams et al., *Implementation of Controlled Floods for Sediment Management on the Colorado River in Grand Canyon under Aridification*, 41 RIVER RESEARCH AND APPLICATIONS 0:1-15 (2024), <https://doi.org/10.1002/rra.4374>.

⁹² *Id.* at 12.

⁹³ *Id.*

⁹⁴ *Id.*

implemented.”⁹⁵ Importantly, Grams et al. (2024) concluded that “[i]n Grand Canyon, sandbar size was maintained only when controlled floods were implemented approximately every 1.5 years on average.”⁹⁶

Reclamation fails to take a hard look at the effects on Grand Canyon flows and resources when HFEs are not a management tool. It is reasonably foreseeable that operating HFEs at lower reservoir elevations, generally, is becoming increasingly difficult, and it is likely that less HFEs will occur. The mechanism completely disappears when Lake Powell is below 3,490 feet. The agency has already acknowledged that HFEs will not be implemented below 3,500 feet. And, “in practice, fall HFEs have not been implemented when Lake Powell water levels were below 3590 feet” and only one spring HFE occurred at elevation 3,523 feet, but was scheduled just before the large water year runoff expected in 2023.⁹⁷ Thus, Reclamation needs to evaluate the cascade of environmental impacts as a result of the loss of this tool.

2. Reclamation fails to assess the risks and benefits of run-of-river operation of Glen Canyon Dam when Lake Powell is at or below elevation 3,525 feet.

Reclamation contemplates a run-of-river strategy for operating Glen Canyon Dam to keep water levels in Lake Powell above critical elevations. The Maximum Flexibility alternative incorporates this strategy:

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

This concept is also briefly mentioned again in the Draft EIS, Appendix A.⁹⁸ Despite this strategy being incorporated into one of the five alternatives, the Draft EIS nor its appendices contain any analysis of what those run-of-river flows might look like, how effective that type of operation might be to keeping Lake Powell above critical elevations, if such steady releases could help prevent entrainment of nonnative fish through Glen Canyon Dam,⁹⁹ how run-of-river operations could negatively impact Colorado River flows in Grand Canyon, or what benefits such operations could provide long-term.

This is a reservoir operation strategy that could be deployed as suggested in the Maximum Flexibility alternative at 3,510 feet or in other circumstances or elevations. It could be a strategy employed certain times of year when low flows historically would have naturally occurred in Grand Canyon and Reclamation could understand whether such a strategy could still meet downstream water deliveries and other goals of the guidelines. Such run-of-river operations may be required as the only option if Lake Powell is maintained at critical reservoir thresholds like 3,490 feet to avoid operation with only the use of the river outlet works.

Further, this would not appear to be a complicated analysis (Lake Powell inflows minus losses) and could serve as a tool that could be deployed voluntarily or as a last resort, depending on reservoir

⁹⁵ *Id.*

⁹⁶ *Id.*

⁹⁷ DEIS at 5-9.

⁹⁸ See Appendix A at A-29.

⁹⁹ Eppehimer et al. (2025), *supra* note 62 at 14; Wheeler et al. (2022), *supra* note 3.

elevations, infrastructure constraints, or a full suite of other considerations. Reclamation failed to take a hard look both at the strategy and its consequences to system resources.

3. Reclamation defines the geographic scope of its analysis too narrowly and thus fails to analyze impacts to key system and environmental resources upstream of Gypsum Canyon.

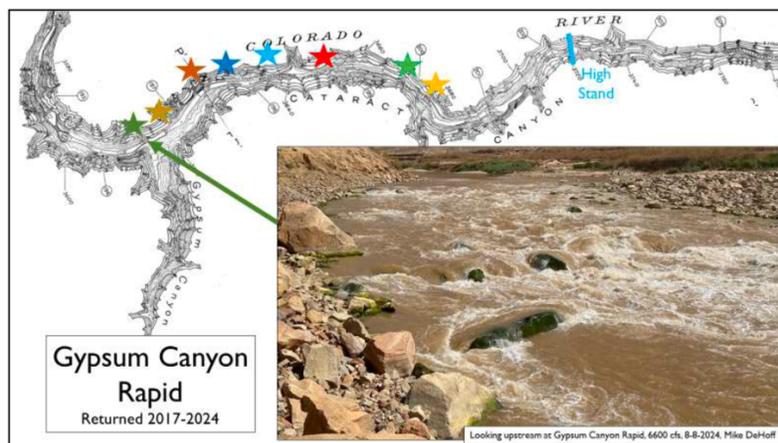
a) Reclamation failed to analyze the environmental impacts to ecosystems and resources above Gypsum Canyon.

Reclamation fails to analyze key environmental impacts by too narrowly defining the geographic scope of the proposed action. The Draft EIS claims that

Consistent with the geographic scope analyzed in the 2007 Interim Guidelines FEIS, the geographic scope that would be affected by the proposed federal action begins at full pool of Lake Powell **at Gypsum Canyon** and extends downstream along the mainstream Colorado River floodplain to the Southerly International Boundary (SIB) with Mexico.¹⁰⁰

While the Final EIS for the 2007 interim guidelines described the geographic scope similarly, it did not include “at Gypsum Canyon” as part of the description.¹⁰¹

Gypsum Canyon is not the boundary line for the historic full pool of Lake Powell. As shown in the 2025 Returning Rapids Project Field Binder¹⁰²(see excerpt below), Gypsum Canyon is located at about River Mile 196.5. The bottom of Gypsum Canyon Rapid—which reemerged from Lake Powell in the 5 years from 2017 to 2024—is found at elevation 3,610 feet. The full pool of Lake Powell, on the other hand, is at River Mile 202.5 at roughly elevation 3,700 feet (near the tail waves of the rapid called Big Drop 2). This is nearly 6 River Miles upstream of Gypsum Canyon. Thus, by defining the full pool of Lake Powell and the upper boundary of the analysis in the Draft EIS, Reclamation excludes roughly 6 River Miles of the Colorado River—miles of river that could be re-inundated by operations under the new guidelines.



¹⁰⁰ DEIS at 1-8 (emphasis added).

¹⁰¹ FEIS for the 2007 Interim Guidelines at 1-7, <https://www.usbr.gov/lc/region/programs/strategies/FEIS/Chp1.pdf>.

¹⁰² Glen Canyon Institute, What's Next: Returning Rapids Field Binder, 4, 28, Returning Rapids Project (2025).

The new geographic scope excludes key river and riparian resources that have been exposed at lower Lake Powell elevations.¹⁰³ In fact, vegetation surveys have been conducted below elevation 3,700 feet by Seth Arens of Western Water Assessment showing the ecological succession in the exposed sections of the Colorado River. A summary of the study provides:

Across all sites and years, 44 vascular plant species were observed in belt transects. At sites above 3,700 feet and not flooded by Lake Powell, 41 plant species were observed; at sites below 3,700 feet, 28 plant species were observed. Plant species present in transects were generally typical to Colorado Plateau upland desert and riparian ecosystems. Several previously flooded sites were dominated by native shrub species (coyote willow and seep willow), had lower abundance of non-native plants and native shrubs were generally more abundant than the non-native tamarisk.¹⁰⁴

Importantly, there are resources in Glen Canyon above Gypsum Canyon that have reemerged since Lake Powell water levels declined in the early 2000s and could be re-inundated if Lake Powell ever reached full pool. Reclamation's modeling does include Lake Powell elevations above 3,610 feet (the bottom of Gypsum Canyon Rapid). For example, Figure TA 14-2 shows the percent of futures where Lake Powell is at least 3,620 feet, which was shown to occur in some modeled alternatives. Reclamation needs to expand its analysis to include consideration of resource impacts in Glen Canyon above Gypsum Canyon and up to and including the full pool of Lake Powell at elevation 3,700 feet.

b) Reclamation failed to analyze the impacts of modeled CRSP reservoir releases on water storage in the initial units and the effects on resources between those reservoirs and Lake Powell.

The Draft EIS should include and analyze the Colorado River upstream of Lake Powell, up to and including, tributaries that will be affected by upstream releases from the Colorado River Storage Project initial units (Flaming Gorge, Blue Mesa, and Navajo reservoirs).

The Draft EIS contemplates Lake Powell PIP releases from Flaming Gorge, Blue Mesa, and Navajo reservoirs when Lake Powell elevations fall below 3,525 in the Basic Coordination and Supply Driven alternatives. Over the full modeling period, Reclamation's modeling indicates that these alternatives keep Lake Powell above 3,525 most of the time (in 90% of months) in 40% and 31% of futures, respectively; those percentages increase to 54% and 52% of futures for the 2027-2039 period.¹⁰⁵ Thus, over the long-term, Lake Powell is projected to fall below 3,525 feet, triggering releases from upstream CRSP reservoirs in more than half (60 to 68%) of futures.

The frequency and volumes of such releases are not insignificant, especially when conditions are critically dry (<10 MAF). Appendix O provides a brief analysis of the volume and frequency of CRSP releases.¹⁰⁶ The maximum PIP release could be as high as 1.1 MAF under the Basic Coordination Alternative and 650,000 AF under Supply Driven. The modeling shows that 90 percent of releases would be 600,000 AF for Basic Coordination and below 390,000 AF for Supply Driven.

¹⁰³ DEIS at 3-97.

¹⁰⁴ Seth Arens, Rapid spontaneous restoration of Glen Canyon ecosystems as Lake Powell dries, RiversEdge West, (2023) <https://www.riversedgewest.org/documents/rapid-spontaneous-restoration-glen-canyon-ecosystems-lake-powell-dries>.

¹⁰⁵ DEIS Figure TA 3-9 at 3-28.

¹⁰⁶ See Appendix O at O-3 and Figure O-2 at O-4.

More significantly, these releases would occur quite often under critically dry hydrology—63% of futures in both alternatives.¹⁰⁷ These releases, however, are also triggered in moderately wet, average, and dry conditions in about 10%, 30%, and 60% of futures in the Basic Coordination Alternative and 5%, 20%, and 50% in the Supply Driven Alternative.¹⁰⁸

Given the frequency and volume of projected PIP releases, Reclamation should have analyzed the impact of those releases on storage in the Flaming Gorge, Blue Mesa, and Navajo reservoirs. Such an analysis would help explore whether those reservoirs can serve as a reliable source of water to supplement Lake Powell, and whether the impacts on water storage in those reservoirs compromise compliance with the records of decisions (RODs) for each reservoir. Reclamation also fails to model recovery of UIUs¹⁰⁹ and just assumes that there will be enough water in those reservoirs even in a series of dry or critically dry years to continue to supplement Lake Powell's water levels and keep it above critical elevations. Additional questions to address include: 1) how often are the CRSP reservoirs tapped (in what order and by how much) to meet downstream Lake Powell needs; 2) how often do the CRSP reservoirs fail to meet the supplemental water needs of Lake Powell; 3) if operated within their RODs, how much does the loss of storage compromise their ability to meet the mandates of those decisions; and 4) at what point does it become impossible to operate the CRSP reservoirs within the RODs, and thus, require Reclamation to seek additional authorities or supplement the original EIS and ROD.

4. Reclamation should conduct a streamflow trace analysis in the Final EIS to assess the challenges and risks associated with a reasonably foreseeable series of dry years.

Reclamation's DMDU analysis does not provide a way for decision makers or the public to assess the near-term effectiveness of the alternatives given a series of dry years. The DMDU analysis simply looks at how a large variety of possible futures perform against observed averages without testing multiple extremes year-over-year and/or adding a percentage reduction to ensure the analysis is extremely conservative.

In the past, Reclamation has conducted streamflow trace analyses and presented them to the public in webinars including: the 2022 Post-2026 pre-scoping webinars¹¹⁰ and for the April and October Revised Draft SEIS for Near-Term Operations (e.g. to understand how quickly the gains from 2023 could disappear given incredibly dry hydrology). The April 2024 SEIS looked at 80% ESP of 2011-2014, and the October Revised SEIS looked at 80% of the 1999-2002 hydrology to provide a conservative analysis. These are helpful exercises to demonstrate how certain measures mitigate the risk of a very dry series of years. This type of analysis will be incredibly important if short-term (2-, 3- or 5-year) guidelines are developed. Such an analysis is critical to understand how alternatives perform under extreme conditions. We strongly urge Reclamation to conduct a conservative streamflow trace analysis in the Final EIS to understand the risks of additional dry years occurring after the moderately dry 2024 and very dry 2025, which were 82% and 49% of the 30-year average of unregulated inflow into Lake Powell, respectively.¹¹¹

¹⁰⁷ *Id.*

¹⁰⁸ See Figure O-2 at O-4.

¹⁰⁹ DEIS Appendix A at A-13. "Recovery of the UIUs is not explicitly modeled. Instead, the reservoirs naturally recover in years without PIP releases as they return to their normal annual operating targets."

¹¹⁰ See as an example, Colorado River Post-2026 Operations Pre-Scoping Webinar Slides 19-25.

https://www.usbr.gov/ColoradoRiverBasin/documents/post2026/2007InterimGuidelinesSEIS_ScopingWebinarPresentation.pdf

¹¹¹ U.S. Bureau of Reclamation, Unregulated inflow volumes into Lake Powell, <https://gcdamp.com/index.php/Hydrology>.

D. 45 days is an inadequate period for public comment based on the length and complexity of the Draft EIS.

The 45-day comment period is not adequate to meaningfully engage the public or provide stakeholders with the opportunity to meaningfully inform the new guidelines. The Draft EIS, Executive Summary, and two sets of Appendices are not only incredibly lengthy (2,190 pages) but also contain very technical information. While we appreciate that Reclamation taking public comment on the Draft EIS, we feel that for meaningful input more time is needed to receive the most helpful and informed feedback from the variety of stakeholders in the basin and the public.

II. In the near-term, Reclamation must keep Lake Powell well above critical elevations to comply with the GCPA and ESA.

A. The new guidelines must be consistent with the Law of the River, including the Grand Canyon Protection Act and other applicable laws.

Reclamation emphasizes that the federal action “is designed to provide for the sustainable management of the Colorado River system and its resources under a wide range of future system conditions” and yet makes clear that the guidelines will be consistent with the Law of the River.¹¹² Reclamation defines the Law of the River and lists some of its “particularly notable” documents, which include the Grand Canyon Protection Act of 1992.¹¹³ Other relevant documents related to Grand Canyon management that are considered a part of the Law of the River include: 1) the 1996 Record of Decision (ROD) on the Operation of Glen Canyon Dam, 2) the 2016 Glen Canyon Dam Long-Term Experimental and Management Plan (LTEMP) ROD, and 3) the 2024 Supplement to the 2016 Glen Canyon Dam LTEMP ROD.¹¹⁴ Reclamation also notes that other provisions of federal law, including NEPA and the Endangered Species Act (ESA), provide a statutory overlay that impacts the actions of the Secretary, although not necessarily considered part of the Law of the River. Thus, these guidelines must be consistent with the Grand Canyon Protection Act, the three RODs that pertain to the management of Grand Canyon flows and resources, and other applicable federal laws such as the NEPA, ESA, the National Historic Preservation Act (NHPA), among others.

To maintain consistency with the Law of the River and other federal law, Reclamation needs to ensure that Lake Powell is not only maintained above critical elevations (e.g. 3,490 feet) to protect dam infrastructure—as is the focus of the NEPA analysis and discussed at length above—but (at least in the short term) the agency needs to prioritize higher elevations (like 3,570 feet) to: 1) ensure HFEs can be conducted at a frequency and duration “to protect, mitigate adverse impacts to, and improve” the cultural and environmental resources below the dam as required by the Grand Canyon Protection Act, 2) ensure the survival and recovery of and prevent “jeopardy” to native threatened and endangered fish in Grand Canyon (e.g. humpback chub and razorback sucker) from nonnative fish establishment and predation, and 3) honor the significant ongoing concerns of tribes, including the Pueblo of Zuni, the Hopi Tribe, and others regarding the taking of life in Marble and Grand Canyons to control nonnative fish using lethal methods.¹¹⁵

¹¹² DEIS at 1-4 and 1-5.

¹¹³ *Id.* at 1-14.

¹¹⁴ *Id.* at 1-15.

¹¹⁵ Tribes have expressed a strong preference for non-lethal measures to protect humpback chub and keep nonnative fish from entering the Grand Canyon. See Glen Canyon Adaptive Management Program Wiki Site: *Tribal Perspectives on Nonnative Fish*

B. The storage buffer in Lake Powell is largely responsible for Reclamation's ability to meet the mandates of the GCPA and ESA over the past two decades.

Over the past 25 years, Reclamation has largely relied on storage in Lake Powell to comply with the mandates of the GCPA (to protect and improve resources in the Grand Canyon) and the ESA (to prevent jeopardy and ensure the survival and recovery of endangered and threatened species). The storage buffer in Lake Powell—until 2022 and 2023 when reservoir levels fell to just below 3,525 feet—prevented the passage of nonnative fish into Grand Canyon, it kept water temperatures cold enough that reproduction and establishment of nonnative fish was not possible, it allowed controlled floods (HFEs) to operate in 9 years from 2000-2023 (a frequent period of 5 HFEs from 2012 to 2018), it met LTEMP minimum daily flows (5,000 CFS and 8,000 CFS), and provided opportunities for low-steady weekend flows to support invertebrate populations (aka “bug flows”)¹¹⁶ from May to August from 2018-2020 and 2022, among others. All of this was possible while largely meeting the needs of water users and hydropower generation, among other benefits.

However, reservoir levels are currently close to critical thresholds—reaching minimum power pool (3,490 feet) or dead pool (3,370 feet) could be just a dry year or two away—and those relatively passive benefits to Grand Canyon resources may no longer be available. We have already seen a retreat from experiments as reservoir levels reached historic lows in 2022. For example, bug flow experiments that occurred consistently from 2018 to 2020 and again in 2022, disappeared from 2023-2025. HFEs were also not conducted, even though triggered by sediment inputs, in 3 of 4 years between 2022 and 2025.¹¹⁷ The 2023 HFE occurred largely because of the incredibly high spring runoff of that year. These experiments, authorized under the 2016 LTEMP and the 2024 SEIS LTEMP RODs, restore sandbars, provide wind-blown sediment to protect archaeological resources, support habitat for fish, wildlife and plants, and allow for healthy insect populations that support bats, birds, and native fish. These experiments are the heart of the Secretary's efforts to “protect, mitigate adverse impacts to, and improve” Grand Canyon's resources as required by the GCPA.

Reclamation's reliance on the passive benefits of higher reservoir elevations caught up with them in their effort to ensure the survival and recovery of native fish in Grand Canyon. For example, in the 2016 LTEMP ROD and Biological Opinion, Reclamation committed to taking several proactive measures to prevent nonnative fish in Lake Powell from entering and establishing in the Grand Canyon.¹¹⁸ Those “conservation measures” included commitments to “explore the efficacy of a temperature control device at the dam to respond to potential extremes in hydrological conditions due to climate conditions that could result in nonnative fish establishment” and “pursue means of preventing the passage of deleterious invasive nonnative fish through Glen Canyon Dam.”¹¹⁹ Reclamation failed to prioritize these commitments. In 2022, when Lake Powell fell to below 3,525 feet, nonnative smallmouth bass were

Removal (including the full text, unedited set of comments, prepared by Kurt Dongoske (Pueblo of Zuni) and Michael Yeatts (Hopi Tribe)), https://gcdamp.com/index.php/Tribal_Resources.

¹¹⁶ Theodore A. Kennedy et al., *Flow Management for Hydropower Extirpates Aquatic Insects, Undermining River Food Webs* 66 *BioScience* 561-575 (2016), <https://doi.org/10.1093/biosci/biw059>. Aquatic invertebrates are essential to the food web of Grand Canyon, and healthy insect populations have significant benefits to bats, birds, and native fish, as well as the larger ecosystem. The daily fluctuation of releases from Glen Canyon Dam is harmful to aquatic insect production and has resulted in incredibly low insect populations in Grand Canyon. Bug flow experiments provide steady low flows to allow for successful insect reproduction.

¹¹⁷ HFEs are not being conducted at elevations above 3,500 feet even when triggered. It should be noted that the same amount of water is released from Glen Canyon Dam whether a HFE occurs or not in any given year.

¹¹⁸ U.S. Fish and Wildlife Service, *Final Biological Opinion for the Glen Canyon Dam Long-Term Experimental and Management Plan*, U.S. Dept. of Int. at Executive Summary E-11 to E-12, E-69 (Nov. 28, 2016), <http://www.riversimulator.org/Resources/USBR/LTEMP/FEIS/BiologicalOpinionGCD2016.pdf>

¹¹⁹ *Id.* at E-11 to E-12.

found in the Colorado River below the dam and there was evidence of reproduction. This has resulted in the authorization and implementation of new mechanisms—cool mix releases from Glen Canyon Dam—to address emerging challenges of nonnative fish passing through the dam and warmer water releases that could allow nonnative fish to become established in Grand Canyon. We encourage the Secretary to continue with cool mix flows and through the new guidelines rebuild storage in Lake Powell, at least over the near-term, to provide time for additional solutions to be explored and implemented.

Former Secretary of the Interior Stewart Udall, in support of the GCPA, testified:

Glen Canyon Dam stands across the mighty Colorado River. The dam will store water and generate electricity. But because the hand of man now controls the flow of water through the dam and through the Grand Canyon, the Congress, acting for the American people, has a responsibility to ensure that our hand is guided firmly by the ethics of stewardship which, like all systems of ethics, require us to accept limits on our behavior. We must resist the arguments of those who, in Ansel Adam's words, "know the price of everything ... and the value of nothing." ... We must be guided by a keen and deliberate appreciation for the value of other forms of life on this planet and our power to harm and destroy them. Above all else, we must conserve and protect those unique resources and values that caused Congress to designate the Grand Canyon as a National Park and make its special qualities available to the American people for all time.¹²⁰

Now is not the time to retreat from these mandates and values. The measures the Secretary has relied on in the past may not be feasible in the over the long-term, but they need to do everything in their authority to meet the GCPA's mandate to "protect, mitigate adverse impacts to, and improve" the cultural and ecological values of the Grand Canyon.

III. In addition to the operational guidelines, Reclamation needs to take the following actions to plan for the sustainable management of the Colorado River and its tributaries over the long-term.

A. Reclamation must conduct a comprehensive study of Glen Canyon Dam Infrastructure.

The agency must immediately commence a comprehensive study of Glen Canyon Dam infrastructure to investigate the structural challenges at low reservoir elevations and ensure that the dam's design does not inhibit adequate flows from passing through the dam into the Colorado River below. The study must provide opportunities for input (throughout the process) from all stakeholders and cannot be limited to just studying water deliveries and power production. The analysis would need to look at infrastructure modifications of the dam to allow not only for movement of water through the dam or hydropower production, but to prevent fish passage, address water temperature, transport sediment, and address any other LTEMP resource issues identified. This would be a broad "feasibility study" that would require congressional authorization and funding. The study should be completed and recommendations made to the Secretary of the Interior by 2030.

¹²⁰ Testimony of Stewart Udall, Former Secretary of the Interior, *Grand Canyon Protection act and Renaming the Salt-Gila Aqueduct as the Rannin-McFarland Aqueduct: Hearing on S. 1556 and S. 2807 Before the Subcommittee on Water and Power*, 101st Cong. 23 (1990).

B. Reclamation needs to develop a contingency plan for operating Glen Canyon Dam below power pool elevation of 3,490 feet.

Based on the foregoing evidence that Lake Powell is likely to fall to and below minimum power pool (elevation 3,490 feet) this year (but certainly over the long-term), a plan needs to be developed for how to operate Glen Canyon Dam to meet the mandates of the GCPA when Lake Powell reaches critical elevations. The Secretary of the Interior is responsible for upholding their mandate under the GCPA to operate Glen Canyon Dam in a manner to “protect, mitigate adverse impacts to, and improve” the cultural and natural resources in Grand Canyon.¹²¹

The GCPA specifically established the Grand Canyon Monitoring and Research Center (GCMRC) to provide the Secretary, and the advisory adaptive management program, with the necessary research, monitoring, and studies “to determine the effect of the Secretary’s actions under section 1804(c) on the natural, recreational, and cultural resources” of Grand Canyon. GCMRC has built a significant body of knowledge on the impacts of the dam and its operation on the Grand Canyon’s resources and developed a range of experiments and activities to mitigate those effects and work to protect and improve resources in the canyons. However, the aridification of the Colorado River Basin over the past 25 years is creating a constant stream of challenges for the scientists as reservoir levels fall—how and when to operate HFEs, how to prevent the passage and establishment of nonnative fish in Grand Canyon, how to ensure variable high and low flows in Grand Canyon, just to name a few. Despite these great challenges and the increasing need for work to solve these problems, the staff of the GCMRC has been reduced significantly in the past year, the budget for the work (already a shoestring) has been cut further (eliminating experiments, monitoring trips, and key staff), and the agency is under a hiring freeze so they cannot staff up or retain or rehire employees when needed. This is not the way to operate an agency as we face a catastrophe on the horizon for the Colorado River and the Grand Canyon. Thus, the Secretary needs to advocate for sustainable funding and staffing of the GCMRC to ensure that they can carry out the mandate under the law.

Further, the Glen Canyon Dam Adaptive Management Program (GDDAMP)—established to provide a forum for consultation between federal, state, tribal, energy, environmental, recreation, and power stakeholders—is key to advising the Secretary about how to comply with their mandate. Given the challenges in the Basin and that measures taken “to protect, mitigate adverse impacts to, and improve” the resources in Grand Canyon may not be available or could require modification of Glen Canyon Dam infrastructure, the Secretary of the Interior needs to request (and provide ample funding) for the GCDAMP and GCMRC to develop a plan for how to operate Glen Canyon Dam to meet the mandates of the GCPA when Lake Powell falls below critical elevations (3,525 feet, 3,500 feet, and 3,490 feet). This plan would include short- mid- and long-term research, monitoring and implementable solutions and would supplement both the 2016 LTEMP ROD and the 2024 LTEMP SEIS. The GCMRC and GCDAMP should also be involved in an advisory capacity in the infrastructure study contemplated above.

IV. Conclusion

The Trust appreciates this opportunity to comment on the Draft EIS for operational guidelines and strategies for Lake Powell and Lake Mead. While we had all hoped that consensus would emerge in the basin around new guidelines to sustain the Colorado River Basin going forward, this is simply not the reality. Basin states have spent decades only incrementally addressing the water supply and demand

¹²¹ GCPA, *supra* note 9 at Section 1802(a) and 1804(c)(1)(b).

imbalance, all the while draining the water savings accounts in Lake Powell and Lake Mead. Instead of preparing, planning, and investing in the future, the basin's stakeholders have clung to the past in hopes the future would be wetter. Time appears to have run out.

It is now up to Reclamation. We appreciate the agency's efforts to model and analyze a range of alternatives. However, given the failure of the states to reach an agreement, the Draft EIS is insufficient to meet the requirements of NEPA. Reclamation must update its analysis to: 1) remedy the flaws in its foundational modeling, including updating the 2026 initial reservoir conditions to reflect the reality of reservoir elevations in the basin, 2) establish and analyze a reasonable range of technically and economically feasible alternatives, including options that protect and improve Grand Canyon's resources, and 3) take a hard look at all the reasonably foreseeable environmental effects of the guidelines, including those that occur when Lake Powell elevations fall below minimum power pool (3,490 feet).

Further, for the guidelines to be consistent with the Law of the River and other provision of federal law, Reclamation must look beyond operational modifications of Lake Powell and Lake Mead. Lake Powell will fall below critical elevations during the remainder of the century; the question is not *if* but *when*. Limited releases from Glen Canyon Dam—based on the infrastructure design constraints—will not only limit downstream deliveries but will have catastrophic impacts on flows in the Colorado River in the Grand Canyon and our ability to “protect, mitigate adverse impacts to, and improve” the cultural and ecological values for which Grand Canyon National Park and Glen Canyon National Recreation Area were established. Reclamation, with the support of Congress, must commence a comprehensive study of Glen Canyon Dam infrastructure to determine if modifications of the dam could provide solutions to some of these intractable challenges.

Until infrastructure and operational studies of Glen Canyon Dam are completed and solutions implemented, the agency must:

- **Follow the GCPA's mandate to “protect, mitigate adverse impacts to, and improve” the cultural and ecological values of the Grand Canyon and Glen Canyon National Recreation Area.** This includes protecting Grand Canyon's native fish, beaches, and cultural resources and archeological sites.
- **Maintain Lake Powell water levels above 3,525 feet and up to 3,590 feet to ensure high flow experiments,** which protect the ecology of the Grand Canyon, can continue to occur.
- **Prioritize keeping Lake Powell above 3,570 feet to prevent nonnative fish** passage until a physical barrier is built to prevent nonnative fish from passing through the dam.
- **Commit and seek authorization to continue cool water releases beyond 2027** from Glen Canyon Dam's river outlet works to maintain temperatures that discourage nonnative fish reproduction. If cool mix flows cannot be maintained, keep Lake Powell above 3,570 feet.
- **Ensure that Glen Canyon Dam releases accommodate the need for variable high and low flows in the canyon** but limit steady high-volume releases to avoid eroding too much sediment from Marble and Grand Canyons.

We look forward to continuing to work with you and other partners in the basin to implement durable, long-term guidelines that protect the sustainability of the Colorado River and its resources into the future.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jen Pelz', with a long horizontal flourish extending to the right.

Jen Pelz
Water Advocacy Director
Grand Canyon Trust