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VIA EMAIL - CRinterimops@usbr.gov.

Dear Ms. Johnson,

On behalf of our respective organizations, thank you for the opportunity to provide input and comment regarding the Bureau of Reclamation's (Reclamation) *"Notice of Intent To Prepare a Supplemental Environmental Impact Statement for the December 2007 Record of Decision Entitled Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations For Lake Powell and Lake Mead"* (SEIS Notice) as published in Federal Register Notice – 87 FR 69042 on November 17, 2022.

The Colorado River (CR) Basin is at a crossroads. As the SEIS Notice points out, both infrastructure and public health and safety within the CR System are at risk. Included in this risk is the environmental health of the CR and its habitats. Unprecedented operational decisions need to be made as soon as possible to help address the Basin's stark conditions and prevent potential system collapses over the next couple of years that could otherwise have reverberating consequences for the CR community and the environment for decades to come. The Supplemental Environmental Impact Statement (SEIS) process is intended to help inform such decisions by evaluating modifications to the Record of Decision for the 2007 Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead (2007 Interim Guidelines) in light of current CR hydrology and reservoir conditions and plausible low runoff conditions over the next four years.

We provide the following comments regarding important contextual imperatives for helping assure the CR community continues to effectively function in the years to come, as well as technical and process considerations to keep in mind and fold into the referenced SEIS process. Also integrated as part of our comments are appendices concerning guiding principles (Appendix A) and parallel process considerations (Appendix B) to further inform the SEIS process and an outline for proposed actions and operating strategy considerations (Appendix C) to more effectively inform useful near-term operations of CR infrastructure.

I. CONTEXTUAL IMPERATIVES

The undersigned organizations appreciate Reclamation's efforts to concurrently pursue both near and longer-term efforts to address the present day challenges in the CR Basin. By applying Bipartisan Infrastructure Law (BIL) and Inflation Reduction Act (IRA) funding and pursuing both short- and long-term changes to CR infrastructure operations, Reclamation is moving in a positive direction toward helping the CR community prepare for and adapt to hotter and drier conditions that are currently experienced and expected to continue throughout the Basin. The challenges, however, implicate complicated technical, legal and policy issues that invoke ties to legal rights, cultural heritage, passionate opinions and competing interests. Recognizing and addressing these obstacles will be integral to the CR community's success in stabilizing the Basin, which is urgently needed. This means Reclamation and its sister agencies, the Basin States, Tribes, and stakeholders will all have to acknowledge and find ways to navigate the interests when considering next steps to take to prevent system collapses and allow the Basin to continue to thrive. Under this framework, there are contextual imperatives that remain critical to furthering this commitment. They include, but may not be limited to, an understanding that:

- (1) **Environmental resources are part of the CR infrastructure and essential to the CR Basin's system integrity, health and safety.** The CR Basin's natural systems and environment are essential parts of system integrity and public health and safety considerations related to the operation of the CR System's infrastructure. The infrastructure's continued safety and functionality cannot be ensured without accounting for the continued viability of critical natural systems and environments that serve as the very building blocks upon which CR communities, economies and ecosystems survive. There is no buffer for system integrity or public health and safety if the environment that sustains them collapses. While impacts to the Grand Canyon, watersheds and river reaches in both the Upper and Lower Basins and wildlife and habitats throughout the CR community have been and will continue to be inevitably affected by the 20+ year drought that has been accelerated by climate change, those impacts can be mitigated and cannot be allowed to be exacerbated by operational decisions concerning CR infrastructure going forward. In other words, it will remain incumbent on Reclamation, consistent with its stated mission¹ and in conjunction with the CR community, to structure updated operations through the SEIS to ensure the Basin's essential natural systems and environments remain functional and are not driven to irrevocably fail or collapse as a result of responses to the ongoing CR crisis.
- (2) **Litigation only delays changes necessary to resolve the Basin's real water security and environmental issues and we are quickly running out of time.** Multi-decadal drought accelerated by climate change has thrown a wrench into the current framework for managing the Basin, and the CR community is scrambling. If there is a perceived imbalance of pain or opportunity by one state, water use sector or group of stakeholders at the expense of others, the incentive to posture and litigate will continue to assure the management system remains

¹ The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public. See [About tab on Bureau of Reclamation Webpage](https://www.usbr.gov/gp/about_us/vision.html#:~:text=Reclamation's%20Mission%20Statement%3A,interest%20of%20the%20American%20public) (https://www.usbr.gov/gp/about_us/vision.html#:~:text=Reclamation's%20Mission%20Statement%3A,interest%20of%20the%20American%20public).

overwhelmed. However, litigation initiated in response to efforts to stabilize the system will only hasten the likelihood that everyone loses in the near-term. Further, if the system's natural resources and environment are allowed to become the first sacrificial lambs in the process, it will devastate the foundational functionality of the system and make it even more difficult to recover. We have to find ways to accept the realities of climate change and all that goes with it to find workable ways to avoid uncertain futures for communities, economies, and ecosystems throughout. ***Reclamation can lead this effort through the SEIS*** process by exhibiting a demonstrated understanding of the competing concerns and issues, being transparent in analyses and decision-making with clear pathways for participation and input, and providing opportunities for consensus and collaboration to address the challenges in a comprehensive and balanced manner. Key principles to consider to help further this undertaking are attached as Appendix A.

II. SPECIFIC CONSIDERATIONS

Specific technical and process considerations for the SEIS process are outlined below. Appendix C further outlines proposed alternative strategies to consider as part of the SEIS process. Rooted within each comment and the proposed alternative are commitments to collaboration and concern for the continued functionality of the CR system and the community and environmental values it supports.

A. Technical Considerations

- (1) ***Top priority must be system stability.*** The SEIS Notice reports that supplemental actions are needed to “ensure that Glen Canyon Dam continues to operate under its intended design” and to “protect Hoover Dam operations, system integrity, and public health and safety” in the near-term. These stated goals can only be achieved if the supplemental actions prioritize conjunctively operating the reservoir facilities to sufficiently stabilize the system over traditional objectives like maximizing water deliveries and generating hydropower. Specifically, supplemental actions must work to ensure that flows (even if they have to be reduced) can continue to run through the system from year to year without the CR community having to scramble to react to conditions as they arise. Otherwise, there will always be a question as to whether public health and safety, system integrity and the operational intent of the reservoirs and dams can be preserved.
- (2) ***Natural systems and the environment must be integrated into the SEIS' overall framework.*** The CR System's infrastructure has been constructed and operated to help provide reliable water deliveries and generate hydropower in a manner that generally integrates environmental and recreational resource considerations throughout the process. Going forward, actions to preserve system integrity and the public health and safety of the CR infrastructure must not overlook opportunities and measures to mitigate or otherwise address destabilizing effects of river operations on key environmental systems throughout the CR Basin. This includes taking affirmative measures to mitigate the effects to and amplify the resources within the Grand Canyon as well as within key reaches of both the Upper and Lower Basins. Proposed strategies associated with such efforts are outlined in Appendix C.

(3) Consider hydropower generation and funding realities. Hydropower generation has traditionally been a priority resource consideration when balancing competing interests to operate CR infrastructure. Present conditions, however, force us to acknowledge the reality that hydropower generation capacity is declining along with system storage at the Basin's largest reservoirs. This inevitably impacts current and future customers of CR hydropower as well as funding for critical CR programs like the Upper Colorado River Endangered Fish Recovery Program, San Juan River Basin Recovery Implementation Program, and Salinity Control Program, among others. Modified operations under the SEIS process to protect the integrity of the CR infrastructure, including the CR itself, should incorporate an evaluation of alternative sources of replacement power (for customers) and funding (for programming) that will help mitigate and not exacerbate the crises over the next few years.

Furthermore, in light of the inevitable decline in hydropower generation, the monthly and daily hydrographs for water released from Glen Canyon Dam and other CRSP Initial Units should be prioritized to minimize impacts and maximize benefits to the downstream resources that will already be affected by drought and climate change conditions in the Upper Basin.

(4) Update hydrologic modeling. For purposes of the SEIS process, it is assumed that modeling results from the Colorado River Mid-Term Modeling System (CRMMS) will continue to drive decision making in the Basin. CRMMS has historically produced forecasts reliant on historic data that biases towards wetter conditions than the Basin is expected to experience going forward. This approach could cripple both the physical system and any attempts to effectively evaluate SEIS alternatives if methodologies remain stagnant. However, during the 2007 Interim Guidelines SEIS Public Informational Webinar on December 2, 2022, Reclamation staff presented various preliminary alternative analyses through CRMMS modeling with updated hydrology inputs. Reclamation publicly explained that such updates are being explored as current CRMMS projections do not reflect a full range of hydrology, as plausible future warmer and drier conditions are not represented in official CRMMS forecasts. With the goal of supporting greater accuracy in analyses, the SEIS process should aim to a) support Reclamation's efforts to incorporate updated CRMMS data and methodologies, including low flow scenarios such as multiple years of 2.5 million acre feet of unregulated inflow (2002); b) address remaining concerns in CRMMS methodologies based on initial SEIS Public Informational Webinar results; and c) promote transparency by providing public documentation and model files of CRMMS updated methodology. Specific recommendations for each of these proposals can be found in Appendix C.

(5) Incorporate opportunities for greater flexibility in decision points and management tools. Modified operations under the SEIS must incentivize and incorporate flexibilities to overcome the otherwise unacceptable risk of collapses within the system. While such flexibilities cannot be unfettered, they can be crafted to fit within legal, policy and management frameworks agreed to by the relevant CR community. Specific modifications to consider for greater operational flexibility in light of near-term risks include: (a) modifying the timing and constraints of decision points for coordinated operation of Lakes Powell and Mead; (b) incorporating greater flexibility in the conjunctive management of the CR infrastructure; (c) updates to the Drought Response Operations Agreement and related procedural documents; (d) modifications to the ICS program;

and (e) changes to the mid-year review process as currently provided in the 2007 Interim Guidelines. The basis for and description of each of these possible guideline modifications are outlined and described in Appendix C.

- (6) Identify steps to account for all water uses within the Basin. Reliable decisions are only as good as the data that informs them. While Reclamation has a dedicated group of specialists available to develop the annual basin water accounting, gaps in the data regarding water uses that are currently not charged to any particular member of the CR community exacerbate uncertainty in potentially viable operations going forward. For the CR community to better understand and support changes considered as part of the SEIS process, Reclamation would benefit from identifying whether and how it will: (1) develop and make available a reliable water balance accounting, including evaporation and transit losses, throughout the CR system; and (2) create a process for determining what constitutes a valid beneficial use consistent with its authorities under C.F.R. 417.
- (7) Synchronize parallel programming with SEIS analysis. The SEIS process must work to identify and assess the impacts of alternative actions on natural resources regardless of where they touch down in the Basin. Otherwise the risk of unintended consequences exacerbating destabilizing conditions within the Basin will remain high. Armed with such impact information, Reclamation can then position itself to best identify how to mitigate such effects through the supplemental actions considered within the SEIS or through pinpointed direction of BIL, IRA or other program funding. Some key parallel opportunities to consider include concerted actions outlined in Appendix B.

B. Process Considerations

- (1) Honor Basin Tribes' sovereign status. As the SEIS Notice recognizes, Basin Tribes are important members of the CR community and sovereign in their own rights. They must be afforded the opportunity to participate in developing comprehensive solutions to the Basin's water challenges. As such, federal agencies should work with Basin Tribes now to identify a mutually agreeable process for coordinating and identifying respective Tribal needs and perspectives into future operational strategies and the decision-making process.
- (2) Build on relationships between the US and Mexico on CR matters. River policies and decision-making are not made in isolation; they inform and impact the rights and interests of water users and the environment within and beyond U.S. borders. The integrity and health and safety of the CR infrastructure will not be achieved unless actions to manage the system through emergent threats recognize and respect (do not undermine/set back) Mexico's interests and needs in the CR. We strongly encourage an approach that ensures the binational process both moves forward with (to the extent feasible) and meaningfully informs the development of management alternatives in the domestic SEIS process – both as a means to better coordinate domestic and international management of the River, and to ensure that the SEIS process includes sufficiently broad analysis to anticipate binational management initiatives and avoid limiting the scope of what may be possible in a future Minute.

- (3) *Ensure engagement and participation from a diverse group of stakeholders is meaningful.* The integrity of Reclamation's decision to modify the operation of CR infrastructure will depend on engaging stakeholders outside of established processes for consensus-building within participating state and tribal governments. If the management of the CR is going to change in ways that increase its resilience to disruption, it requires consideration of institutional approaches for identifying and addressing system risks that do not depend only on existing, established governance mechanisms, information channels, and consensus-building processes that are already struggling to keep up with the rate and scale of change in this system. We are encouraged by the express references to stakeholder coordination, consultation, and outreach in the SEIS Notice. They are the important steps to ensuring the rights and interests of the CR community are sufficiently considered and included in the new CR management strategies. As such, the process should, among other things:
- (a) *Provide transparency for stakeholders, decision-makers and the interested public. Reclamation should provide useful mechanisms for keeping stakeholders, decision-makers, and the interested public informed of progress and developments from the SEIS effort.* This includes things like: (1) a dedicated website that contains relevant information, identifies key contacts, and provides a clear calendar for impactful communication and feedback opportunities; (2) a mechanism for broadcasting important updates and notices of meetings, conferences, and webinars (e.g., through social media among other sources); (3) Consultations, public meetings and webinars to provide substantive updates.
 - (b) *Involve a diverse group of stakeholders to fully encompass the complete set of relevant CR interests and perspectives in the SEIS analysis.* This includes providing forums (in relevant and appropriate languages) for various groups to interact and discuss options and considerations going forward. This may be particularly important in terms of cultivating the identification of vulnerabilities and solutions relevant to a robust decision-making process, which should take advantage wherever possible of local stakeholder knowledge to better inform the understanding of risks and issues that can result from conditions that may develop in the face of increasing uncertainty. It will require scheduling outreach at relevant, timely intervals to provide a reasonable opportunity for gaining an understanding of the SEIS analysis. It will also require confirmation that Reclamation is willing to make itself available to interested stakeholders (and not just one group or water user sector) to inform the various elements of the SEIS investigation.
 - (c) *Provide for iterative discussions and feedback from stakeholders with a proven record of problem-solving and collaboration.* Stakeholders (like the undersigned conservation groups) who have a demonstrated commitment and willingness to address the Basin's water challenges should be afforded opportunities to work directly with state, Tribal and federal agencies on the SEIS efforts. Specifically, committed stakeholders who have shown a willingness to promote solutions should be allowed to better understand the details of the proposed SEIS investigation as it develops, have iterative dialogue, and provide substantive suggestions for consideration in development and assessment of the SEIS investigation. As we did in 2007, the undersigned NGOs fully intend to invest significant resources and analytical effort in the development of alternatives and analysis during the preparation of both the Draft and Final SEIS.

We sincerely value the effort to protect the CR System's integrity, health and safety and environment, and appreciate the opportunity to inform the operational decision making process over the near-term. We look forward to working with Reclamation and the rest of the CR Community to inform the important short-term management decisions to help stabilize the Basin and preserve its ability to function for the benefit of individuals, communities, economies, and ecosystems throughout the Basin.

Signed:

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APPENDIX A

GUIDING PRINCIPLES FOR DECISION MAKING PROCESSES IN THE COLORADO RIVER BASIN

The SEIS process is intended to help identify how best to manage the CR infrastructure in the next two+ years so that it can continue to operate for the purposes intended, protect system integrity and preserve public health and safety in the face of an otherwise possible whole system collapse. Given the risks involved and the possible need for urgent action, the process could be subsumed by disruptive and intervening events if not clearly defined and adequately constructed. To avoid this outcome, the SEIS process should be guided by overarching principles that help inform the overall decisions. Key principles to consider include recognition that federal strategies, actions, and operations should generally work to:

- (1) **Advance water security for people, economies, and the environment.** Water security remains essential to water users and ecosystems throughout the Basin. Modeling of past hydrology is insufficient to help plan and inform future conditions. Advancing water security going forward requires operational strategies that consider more than the minimum, most and maximum probable hydrologies based on historic hydrology. They must also be informed by the full range of possible climate, hydrologic, soil and other conditions in the face of uncertain water futures that will allow the CR community to effectively plan for and adjust to changing conditions.
- (2) **Have near-term actions complement long-term management/resilience building endeavors.** Experience over the past 20 years reveals that the scale and pace of climate-related changes in the CR Basin are affecting availability and reliability of water supplies for the continued viability of agricultural operations, rural and urban water demands, energy use and watershed health over the long-term. The SEIS process is not an isolated effort. The long-term operation of the CR System post-2026 is an important effort that Reclamation is pursuing concurrently to the SEIS. Moreover, funding for drought mitigation and resilience building through the IIJA and IRA are in full force. The near-term actions considered under the SEIS process must work in tandem with, and not impede, these ongoing efforts to manage the Basin over the long-term.
- (3) **Share the benefits and burdens of system operations.** We recognize that there is a need to sacrifice as a result of the immediate conditions the Basin is facing. While prepared to sacrifice, however, we are not willing to accept complete dispossession. For there to be a hope of successfully operating the system in the near-term, water challenges and opportunities must be shared across the CR Basin. If there is an imbalance of pain or opportunity for one state, water use sector or group of stakeholders at the expense of others, the incentive to posture and litigate will subsume and overcome the management system and devastate the Basin's natural resources in the process. Working within the intent and purpose of the Compact and the broad range of other existing agreements, the SEIS analysis must identify strategies that mitigate effects to critical environmental systems, remove opportunities to "game the system" at the expense of others and promote a sharing of the burdens and benefits within the CR community.
- (4) **Enable sufficient flexibility to adjust to and accommodate changing conditions.** SEIS strategies and operations should include flexible policies that can respond to changing conditions and prevent any part of the system from irretrievably breaking. Innovative policies that include a scale of decision points and operations (as opposed to hard deadlines and triggers) offer greater opportunities for adjusting to and accommodating circumstances as they arise. While such

policies cannot be unfettered, they can be developed with sideboards to play an important role in maintaining system integrity and public health and safety in the Basin.

- (5) **Allow and consider perspectives from the entire CR community through transparent and inclusive SEIS processes.** Federal leadership is critical to protecting system integrity and promoting public health and safety of the CR infrastructure. But it cannot operate in a vacuum to decide the needs and interests of the entire Basin community. The viability of near term actions and operations will also depend on the commitment of the CR community's sovereigns (States, Tribes and Mexico) and stakeholders to actively participate and on Reclamation's willingness to consider and integrate the perspectives from the full range of CR community members when developing alternative actions to evaluate and deciding the preferred alternative to implement in the near-term.
- (6) **Be mindful of important environmental programs within the Basin.** To safeguard environmental conditions that provide foundational functionality for the Basin, the Bureau's SEIS process should be mindful of and not overlook:
- (a) *Effective recovery programming and species protection.* Programs like the Upper Colorado River Endangered Fish Recovery Program, San Juan River Basin Recovery Implementation Program, Long-Term Experimental and Management Program, and Multi-Species Conservation Program will continue to be important to the overall functionality of the river system during SEIS operations. Existing species and recovery programs, and their related funding sources, may need to be concurrently fortified or updated to effectively manage for changed conditions and provide for continued protection, mitigation and recovery of critical resources, species and habitats at the appropriate scale.
 - (b) *Interconnected systems.* The CR System cannot effectively operate to stabilize conditions at the expense of other watersheds going forward. Additionally, understanding the demands and constraints of adjacent watersheds/systems could directly or indirectly impact supplies (i.e., transmountain or transbasin diversions) and inform the stability of the CR Basin going forward. As the Basin works to implement river policies and management decisions that will sustain the system in the short and long-term, it will be important to consider and avoid harm to systems that are interconnected and/or dependent on, but separate from, the consideration of the annual water supplies within the CR Basin. Such interconnected systems, include but may not be limited to: (a) Significant groundwater overdraft; (b) San Juan Chama/Rio Grande; (c) other transbasin diversions; and (d) Salton Sea.

APPENDIX B

CONSIDERATIONS FOR SYNCHRONIZING THE SEIS WITH PARALLEL PROGRAMING IN THE COLORADO RIVER BASIN

SEIS management strategies and operations will not be the sole answer to all the issues afflicting the Colorado River Basin. Parallel activities, in addition to those contemplated by Reclamation's SEIS analyses, will be critical to the continued integrity, health and safety of the Basin. While focused on modifications to operations over the next two years, the SEIS process should, to the extent possible, anticipate tools that would be valuable to these parallel processes to ensure the longevity of workable operations going forward. Some key parallel activities to consider include concerted actions regarding:

- (1) ***Incentives to promote adaptation and resilience building within the Basin.*** New operational strategies will inevitably influence the extent to which the Basin can continue to function, let alone thrive, over time. Therefore, the strategies, elements and operations considered should, wherever possible, complement or contribute to (and not conflict with other efforts to) other federal, state and Tribal efforts to build much needed drought and climate change resilience in the coming years.
- (2) ***Post-2026 Management Strategies and Operations.*** Concurrent with the SEIS process, Reclamation is evaluating the long-term operation of the CR System post-2026. While separate endeavors, they cannot be done in isolation. How the SEIS process unfolds will inevitably influence the Post-2026 evaluation and vice versa. Wherever possible, therefore, these efforts must work in concert and avoid conflicting with each other.
- (3) ***Mexico/Delta.*** Modifying operational strategies under the SEIS and continued operation of the Minutes to the 1944 Water Treaty are interrelated. One will not be able to fully work without the other. Stabilizing the system that will, in turn, help maintain water and life within the Basin will depend in part on how binational relationships and opportunities will be considered and cultivated throughout the SEIS processes.
- (4) ***Salton Sea.*** Reclamation recently announced a "Landmark Agreement to Accelerate Salton Sea Restoration" using IRA funds. SEIS strategies should work in tandem with these efforts, recognizing that impacts to public health and wildlife associated with reduced flows to the Salton Sea will be important for Imperial Valley's active involvement in developing workable CR strategies to adapt to the dwindling Basin water supplies.
- (5) ***Groundwater.*** As the availability of CR water decreases, the focus on groundwater supplies is likely to increase. Mining groundwater, however, is not a sustainable solution for the Basin. The SEIS analysis of alternatives on groundwater supplies will remain a critical part of the overall analysis for developing workable strategies and operations for the Basin.
- (6) ***Access to clean water.*** Access to reliable, clean, and drinkable water is an essential human need. However, it is not ubiquitous in the CR Basin, especially for Page, Arizona and tribal nations that depend on water from Lake Powell. SEIS strategies must identify ways to maintain reliable access to clean drinking water and adequate sanitation for CR community members, including Tribes, who are at risk in the face of near-term conditions.
- (7) ***National historic preservation considerations.*** The CR's cultural resources are an integral part of the Basin's history and identity. Consideration of how to preserve these resources should not be ignored as the CR community develops SEIS strategies for the Basin.

APPENDIX C

OUTLINE OF PROPOSED ACTIONS AND OPERATING STRATEGY CONSIDERATIONS AS PART OF SEIS PROCESS

The experience of the past two decades has been about chasing the declining hydrology with incremental actions that could not accurately anticipate the Basin's extreme conditions. This has resulted in an increasingly dire situation for the Basin that has placed everyone and everything in this system at risk. Recognizing this risk, the Bureau of Reclamation (Reclamation) has announced its development of a Supplemental Environmental Impact Statement (SEIS) to consider near-term modifications to the 2007 Record of Decision regarding the *Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations For Lake Powell and Lake Mead*.

This document outlines possible actions and strategies to consider when working to modify specific components of the 2007 Interim Guidelines in a manner that recognizes and helps protect the integrity, health and safety of the Colorado River system over the short-term. Embedded as a fundamental premise is the need to protect the CR System's infrastructure, acknowledging that the infrastructure includes the river system itself. The proposed strategies track with the comments set forth in the conservation group's joint comment letter regarding the SEIS scope and alternatives. The strategy goals are intended to help avoid, minimize, or mitigate more drastic approaches that would inevitably result in significant disruptions and impacts to the Basin's communities, economies, and environment.²

Proposed actions and operating strategies to consider as part of the SEIS process are outlined as follows:

- I. **Prioritize sufficient stabilization of the CR system under critically low storage conditions.** Supplemental actions should prioritize conjunctively operating the reservoir facilities to sufficiently stabilize the system over traditional objectives like maximizing water deliveries and generating hydropower. This includes efforts to ensure flows (even if they have to be reduced) can continue to run through the system from year to year without the CR community having to scramble to react to conditions as they arise. Otherwise, there will always be a question as to whether public health and safety, system integrity and the operational intent of the reservoirs and dams can be preserved.
- II. **Pursue greater flexibility in conjunctive management of CR infrastructure.** The CR infrastructure will remain at risk unless operational strategies can be modified in the near term to store and access water where needed to protect system integrity, health and safety. This reality suggests that greater flexibility in conjunctively managing the CR reservoir system is an essential priority for the SEIS process. Specifically, the SEIS should include evaluation of an operational/management strategy that is based on more than reservoir elevations assuming probabilistically predictable reservoir inflows (e.g. CRMMS forecasts). It should consider

² NOTE: The strategy considerations outlined in this Appendix C are proposed recognizing the need to work within legal frameworks applicable to both the Upper and Lower Basins. Whether it be through existing authorities and agreements or future consensus arrangements, there are ways to accomplish the proposed strategies through innovative thinking and practical applications that we are ready and willing to discuss at the convenience of interested parties.

operational/management strategies based on storage conditions and/or recent historic hydrologic trends, e.g. previous water year inflow or average of the previous 3-5 year inflow to determine appropriate release volumes from Lakes Powell and Mead (and possible other facilities) that are aimed at protecting CR infrastructure including river essentials (i.e., protecting against dead pool at Lakes Powell and Mead while ensuring continued running of CR water through the system). Reclamation has already demonstrated elements of such an approach in conjunction with the Basin States during the emergency management actions taken in May 2022.

- III. ***Integrate natural systems and the environment into the SEIS' overall framework.*** Actions to preserve system integrity and the public health and safety of the CR infrastructure must not overlook opportunities and measures to mitigate or otherwise address destabilizing effects of river operations on key environmental systems throughout the CR Basin. This includes taking affirmative measures to mitigate the effects and amplify:
- A. *Grand Canyon resources.* The Grand Canyon is one of the world's most iconic landscapes with diverse ecosystems, biological communities, and scenic vistas. The SEIS process will inevitably implicate and impact this world renown landscape.³ While impacts may be inevitable, it will be important for Reclamation to coordinate considerations and responsibilities with other federal agencies, advisory groups and stakeholders to assure such impacts are sufficiently identified and mitigated as part of the SEIS process. Recommendations include:
1. Prioritizing operations to assure continued flows from Glen Canyon Dam through the Canyon from year to year.
 2. Identifying how changes to monthly and daily hydrographs will be accomplished in concert with any annual release modifications at Glen Canyon Dam to accommodate natural systems and resources that remain important to the overall stabilization of the system (see Technical Consideration #1, in letter above).
 3. Considering the mechanisms for weighing additional resource and recreation trade off based on information and support of the Grand Canyon Research and Monitoring Center (GCMRC) and Glen Canyon Adaptive Management Workgroup (AMWG). Specifically, the continued need for High Flow Experiments, blue-ribbon trout fisheries, non-native fish mitigation flows, and protection against wide temperature swings, among other considerations remain essential to preventing the collapse of critical resources, species and habitat in the Grand Canyon.

³ The Purpose and Need Section of the SEIS Notice provides: "In order to ensure that Glen Canyon Dam continues to operate under its intended design, Reclamation may need to modify current operations and reduce Glen Canyon Dam downstream releases, thereby impacting downstream riparian areas and reservoir elevations at Lake Mead. Accordingly, in order to protect Hoover Dam operations, system integrity, and public health and safety, Reclamation also may need to modify current operations and reduce Hoover Dam downstream releases." FR 87 FR 69042, 69043 (November 17, 2022).

- B. *Key natural systems and the environment in the Upper and Lower Basin.* This can be accomplished in the SEIS by:
1. Identifying the key reaches in the Upper and Lower Basins
 2. Exploring ways to minimize and/or avoid the loss of natural systems and environmental resources in these reaches.
 3. This may involve impact investigations and mitigation considerations for resources downstream of each Colorado River Storage Project Initial Unit in the Upper Basin, in the Grand Canyon, and as part of the Lower Basin Multi-Species and Conservation Program.
 4. This effort would also include identifying opportunities for, among other things, advancing watershed health, avoiding the dry up of the downstream river reaches and incorporating maintenance of flowing rivers and important aquatic habitats for critical species as part of the modified operational considerations.
 5. Considering different outcomes as appropriate for reaches along the CR and its tributaries based on:
 - i. direct flow metrics (e.g., average flow, peak flow, minimum flow, and water deliveries);
 - ii. derived flow metrics (e.g., salinity, stream temperature, sediment transport), and
 - iii. resources-specific metrics (e.g., relevant threatened and endangered species and critical habitat, native and invasive fish populations, aquatic parasites, vegetation, etc.).

IV. **Adopt key changes to hydrologic modeling:** For each of the operating alternatives, including a Stabilization Framework Approach informed by considerations in this Appendix, the SEIS process would consider:

- A. *Incorporating newly developed CRMMS inflow hydrologies and methodologies to more accurately assess SEIS alternatives.* We appreciate Reclamation’s work to explore “new [forecast] methods [to] capture drought and hydrologic variability more effectively, seeking to improve projections of reservoir operations in the future,” as evidenced by the December 2nd presentation and a body of published work from Reclamation staff and partners.⁴ In partnership with the National Oceanic and Atmospheric Administration and National Center for Atmospheric Research, we commend Reclamation’s recent establishment of the Colorado River Basin Operational Prediction Testbed, which aims to “provide a quantitative and consistent framework for assessing the skill of [CRMMS]

⁴ Baker, S. A., A. W. Wood, B. Rajagopalan, J. Prairie, C. Jerla, E. Zagona, R. A. Butler, and R. Smith. (2022). “The Colorado River Basin operational prediction testbed: A framework for evaluating streamflow forecasts and reservoir operations.” J. Am. Water Resour. Assoc. <https://doi.org/10.1111/1752-1688.13038>

streamflow forecasts and their impact on associated reservoir system projections.”⁴ Initial Testbed results found that a new dataset developed by Reclamation staff called “Climate Informed k-nearest neighbors” (Clim-kNN) outperformed existing inflow forecasts. While Clim-kNN has not yet been incorporated in CRMMS 24 Month Study official methodology, the December 2nd SEIS presentation use of updated CRMMS inflow forecasts to reflect a lower range of flows indicates that Reclamation is aiming to more accurately assess SEIS alternatives considering a warmer and drier future.⁵ We ask that Reclamation continue improving such methodologies, building off of the body of work referenced above, including low flow scenarios such as multiple years of 2.5 million acre feet of unregulated inflow (2002) to reflect such futures in all official SEIS alternative analyses.

- B. *Addressing CRMMS “outyear” 2026 rebound displayed in preliminary alternatives analyses during SEIS Public Informational Webinar.* Based on the Reclamation’s SEIS preliminary CRMMS alternative analyses figures presented on December 2, 2022, we believe that the Lake Powell and Lake Mead are in fact reaching more realistic estimates given the use of 80% of early 2000’s hydrology inflows. Nevertheless, it remains important for Reclamation to address the “outyear” rebound dynamic.

This “outyear” rebound dynamic is generated under this new 80% ESP Analysis due to use of 2005 inflows, which were 125% of average, and is generated in the CRMMS 24 Month Studies, due to use of ESP trace 50th percentile for the Minimum Probable forecast after the initial two years with the 25th percentile. This rebound effect has hindered appropriate management outlooks and discussions in the 24 Month Study projections, and we are looking to Reclamation to avoid this dynamic in SEIS alternatives analyses. If Reclamation plans to continue use of 2002 - 2005 hydrology for the SEIS analyses, several iterations and randomizations of these water year inflows will be important. More specifically, we recommend allowing water years to repeat at least twice, and not requiring all water years to be included. For example, instead of 2002 - 2005 acting as 2023 - 2026, use: 2005, 2002, 2002, and 2004, or 2002, 2003, 2002, and 2004, and so on. We want to avoid a false sense of rebound in the future where no such indication exists within our understanding of climate projections, plausible Basin conditions, and recent trends.

- C. *Promoting transparency by providing public documentation and model files of CRMMS updated methodology.* In order to inspire confidence in newly developed methods and datasets to support SEIS alternative analyses through CRMMS, we request that Reclamations produce public documentation on both the updated methodologies and the underlying analyses and specific logic that led to newly developed methods and datasets, in addition to the associated CRMMS model files to enable reproducibility by external stakeholders.

⁵ Baker, S. A., B. Rajagopalan, and A. W. Wood. (2021). “Enhancing ensemble seasonal streamflow forecasts in the Upper Colorado River Basin using multi-model climate forecasts.” *J. Am. Water Resour. Assoc.* 57 (6): 906–922. <https://doi.org/10.1111/1752-1688.12960>

- D. *Extending the scope of impact analysis beyond storage conditions and static trigger levels at Lakes Powell and Mead to include area activities under the Drought Contingency Plans as applicable, including in and around the Colorado River Storage Project's Initial Units.*

IV. Incorporate flexible decision points and management tools into decision-making processes and operating procedures. Specific operational modifications to consider for greater operational flexibility in light of near-term risks include:

- A. *Changes to timing and constraints of decision points* - Operational decisions under the 2007 Interim Guidelines are based on single point in time modeling results that have not served the system well. For example, relying solely on the August 24 Month Study to inform annual release determinations from Lake Powell for the upcoming water year precludes useful management adjustments based on actual conditions throughout the year. Moreover, limiting opportunities to adjust operations under the April 24 Month Study solely for the purpose of accomplishing greater releases from Lake Powell (i.e., see Section 6 of 2007 Interim Guidelines regarding adjustment to annual releases based on April 24 Month Study) are counterproductive to the purpose and need of the SEIS process. Reclamation should move away from only relying on the August and April 24 Month Studies toward a more phased decision approach to allow annual release determinations to be adjusted as needed on a more seasonal basis. While this may complicate annual water planning objectives, it can help avoid or disincentivize actions that could be perceived as manipulating rulesets to advantage one basin at the expense of another. Moreover, it reduces the need to adjust under emergency powers or mid-year reviews for which those same water planners would have to anticipate and prepare for anyway or be caught unawares when it happens.
- B. *Updates to the Drought Response Operations Agreement and related procedures* - The SEIS Notice indicates the No Action Alternative will include the Colorado River Drought Contingency Plan operations layered on top of shortage and coordinate reservoir management activities under the 2007 Interim Guidelines. The scope of the SEIS, therefore, will include, among other things, the Upper CR Basin Drought Response Operations Agreement (DROA). Recent lessons suggest that consensus updates to the DROA could help improve reservoir operations and streamline its utility under modified SEIS operations. Possible updates that could be made through a revised framework among the parties include:
 - 1. Expanding the DROA's purpose and intent to include protection of critical infrastructure at Glen Canyon Dam (in addition to protecting minimum power pool and helping maintain compact compliance). This type of update would provide two benefits. First, it could help resolve some debates over the effectiveness of DROA releases from Initial Units. Second, it could directly help "ensure that Glen Canyon Dam continues to operate under its intended design."

2. Revising the DROA Framework to allow for planning timelines that provide for consensus decisions on how to protect against a Spring dip in storage, which currently precedes final decisions for DROA planning from year to year. To further assuage future concerns with DROA activities, the updated process could fold in additional check points for collaborative agreement on how to manage DROA releases throughout the year.
 3. To incentivize both (i) and (ii), consider removing the volume of water released under DROA from the calculations for coordinated management of Lake Powell and Lake Mead (i.e., make DROA water storage on top of coordinated reservoir water a/k/a top storage). If the DROA water is intended to protect infrastructure and power pool at Glen Canyon Dam, releasing it as part of Powell/Mead balancing operation would be counter-productive. Similarly, allowing for the DROA water to be top storage that is released as needed regardless of coordinated Powell/Mead operations would allow releases to be made when they are actually needed, and not solely based on different planning horizons (i.e., completion of the April 24 Month Study or runoff estimates following snow seasons, etc.). These types of flexibilities *may* help improve and overcome obstacles associated with the current DROA.
- D. *Modifications to the Lower Basin Intentionally Created Surplus Program* - ICS has been a successful tool in encouraging efficient use and management of Colorado River water, increasing overall system storage in Lake Mead, and providing additional operational flexibilities for Lower Basin water users. However, there has been concern that ICS rules allow ‘gaming’ of the system, where Lower Basin ICS creators could add or remove stored ICS from Lake Mead in ways that potentially manipulate forecasts used for determining operations. Updates to the Lower Basin ICS program, including Extraordinary Conservation ICS, DCP ICS, and BICS ICS, may improve coordinated management of the CR infrastructure to protect system integrity, health and safety within the Basin, while reducing the risk of potential ‘gaming of the system’. Specific short-term updates that may be relevant for SEIS consideration include:
1. Enabling Upper Basin facilities to accept storage of Lower Basin ICS water. Allowing water to be stored where needed can enhance opportunities for protecting critical infrastructure as needed in both the Upper and Lower Basins.
 2. Constraining the take of ICS storage to protect critical storage elevations at Lake Powell in addition to Lake Mead. Just as the Lower Basin Drought Contingency Operations limit the take of ICS when Lake Mead storage is below 1,110 feet, updates to the program that allow for storage of ICS in the Upper Basin could constrain release of ICS to avoid risk to critical infrastructure at Lake Powell (or other Upper Basin facilities).
 3. Removing ICS storage volumes from the calculations for coordinated management of Lakes Powell and Mead - i.e., make ICS storage top storage that is not counted towards lake elevations when making equalization and balancing determinations under the Guidelines. Similar to the DROA updates suggested above, ICS

conservation in the Lower Basin can be incentivized and thereby benefit the system by removing the volume of ICS stored in CR facilities from the calculations for coordinated management of Lakes Powell and Mead. If ICS is allowed to be stored in the Upper Basin (or releases from the Upper Basin are allowed to be reduced by the same amount of ICS created and stored in the Lower Basin), then including the volume of created and stored ICS in the balancing calculations between Lakes Powell and Mead is no longer appropriate. Rather, the focus could turn to identifying how and when the ICS volumes could work to help protect integrity throughout the system. Moreover, changes in ICS creation volumes as allowed under the Interim Guidelines for “changed conditions, emergency, or hardship” becomes less of a trigger for scrutiny and debate between Upper and Lower Basin parties because they would no longer inform the accuracy of suitable annual release determinations from Lake Powell from year to year.

- E. *Changes to the mid-year review process* - The SEIS process must include updates to the mid-year review process as outlined in the 2007 Interim Guidelines if it is going to ensure operational decisions can be adjusted to address conditions as they change within the Basin beginning with Water Year 2023. The current mid-year review process only allows the Secretary to consider operational revisions to the Annual Operating Plan if requested by any Basin State or the Upper Colorado River Commission. However, the Secretary can only make a one-time revision through this mid-year review to apply for the remainder of the water year. The decision to make any revisions is intended to be “based on objectives to avoid curtailment of uses in the Upper Basin, minimize shortages in the Lower Basin, and not adversely affect the yield for development in the Upper Basin.” Further, to perform the review, the Secretary must rely on the April 1 forecast of April through July runoff among other relevant factors. Finally, the Secretary can only make revisions to Lower Basin operations to allow for additional releases from Lake Mead. Important modifications to this process for the near-term management of the CR infrastructure include:
1. Allowing not only the States or Upper Colorado River Commission, but also other relevant parties, including the Secretary herself, to call for a mid-year review of CR operations.
 2. Expanding the reasonable bases for a mid-year review to include protection of CR infrastructure’s integrity, health and safety, consistent with the stated purpose of the SEIS.
 3. Acknowledging the need for operational decisions to be made or confirmed in phases throughout the water year. The updated mid-year review process should, either be in addition to phased decision making processes throughout the year or be allowed to remove the current implied limitation that operational revisions can only be made once to apply for the remainder of the Water Year.

4. Expanding the actions that can be taken in a mid-year review to include reduction in releases from Lake Powell or Lake Mead as needed to protect identifiable risks to system integrity, health and safety within the Basin.
5. Updating the factors the Secretary will consider in performing the mid-year review to include the most relevant modeling as agreed to by the CR community at this time.
6. Allowing for other considerations or limitations raised by relevant CR stakeholders based on changed conditions, emergency or hardship, as appropriate.