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August 15, 2023

Ms. Amanda Erath  
Colorado River Post-2026 Program Coordinator  
Bureau of Reclamation  
(303) 445-2766

**Re: Notice of Intent to Prepare an Environmental Impact Statement and Notice to Solicit Comments and Hold Public Scoping Meetings on the Development of Post- 2026 Operational Guidelines and Strategies for Lake Powell and Lake Mead.**

Dear Ms. Erath:

This scoping letter is provided by Living Rivers, Colorado Riverkeeper, Center for Biological Diversity, Great Basin Water Network, River Runners for Wilderness, Save The Colorado, Las Vegas Water Defender, Glen Canyon Institute, Utah Rivers Council and Waterkeeper Alliance in response to the Bureau of Reclamation's (Reclamation) Notice of Intent to Prepare an Environmental Impact Statement and Notice to Solicit Comments and Hold Public Scoping Meetings on the Development of Post-2026 Operational Guidelines and Strategies for Lake Powell and Lake Mead (Notice). 88 Fed. Reg. 39455-58 (June 6, 2023). We attended the formal scoping meetings and we also provided oral comments.

Thank you for this opportunity to provide written comments regarding the development of an Environmental Impact Statement (EIS) in accordance to the National Environmental Policy Act (NEPA). Our comments address the direct, indirect and cumulative effects of all of the relevant Reclamation operations and a range of alternatives that illuminates the consequences of the choices for decision-makers as they undertake in new management paradigms on the Colorado River into the future with declining flows and increasing temperatures.

Many of us provided pre-scoping comments to Reclamation regarding this project in 2022. In addition, we have submitted comments to Reclamation on earlier environmental reviews and studies closely related to the current process for the Post-2026 Operational Guidelines. Our earlier comments submitted to Reclamation are incorporated herein by reference and should be included as part of the administrative record of this Post-2026 EIS. Hyperlinks are provided below for your convenience.

2005 Scoping for Shortage Criteria	<a href="http://www.livingrivers.org/pdfs/TheOne-DamSolution.pdf">http://www.livingrivers.org/pdfs/TheOne-DamSolution.pdf</a>
2007 Draft EIS for Shortage Criteria	<a href="http://www.livingrivers.org/pdfs/LR_Shortage_DEIS.pdf">http://www.livingrivers.org/pdfs/LR_Shortage_DEIS.pdf</a>
2010 - 2012 Basin Study	<a href="http://www.riversimulator.org/Resources/USBR/BasinStudy/LivingRiversCommentsBasinStudyJuly2011.pdf">http://www.riversimulator.org/Resources/USBR/BasinStudy/LivingRiversCommentsBasinStudyJuly2011.pdf</a>
2010 - 2012 Basin Study	<a href="http://www.riversimulator.org/Resources/USBR/BasinStudy/Comments/LivingRivers.pdf">http://www.riversimulator.org/Resources/USBR/BasinStudy/Comments/LivingRivers.pdf</a>
2012- 2016 Scoping LTEMP	<a href="http://www.riversimulator.org/Resources/NGO/LTEMP/LTEMPeisCommentsLivingRivers31Jan2012.pdf">http://www.riversimulator.org/Resources/NGO/LTEMP/LTEMPeisCommentsLivingRivers31Jan2012.pdf</a>
2013 - 2015 Moving Forward	<a href="http://www.livingrivers.org/pdfs/MovingForwardComments11August2015LRandCBD.pdf">http://www.livingrivers.org/pdfs/MovingForwardComments11August2015LRandCBD.pdf</a>
Letter to Secretary Salazar (LTEMP)	<a href="http://www.livingrivers.org/pdfs/LRtoSalazar2April2012.pdf">http://www.livingrivers.org/pdfs/LRtoSalazar2April2012.pdf</a>
2016 LTEMP DEIS	<a href="http://www.livingrivers.org/pdfs/LRcommentsGCDltemp9May2016.pdf">http://www.livingrivers.org/pdfs/LRcommentsGCDltemp9May2016.pdf</a>
Drought Contingency Planning	No opportunity provided for public participation
7.D. Review 01	<a href="http://www.riversimulator.org/Resources/USBR/7D/7DcommentsLivingRivers.pdf">http://www.riversimulator.org/Resources/USBR/7D/7DcommentsLivingRivers.pdf</a>
7.D Review 02	<a href="http://www.riversimulator.org/Resources/USBR/7D/Final/Comments2020Nov/7DReportCommentsLivingRivers.pdf">http://www.riversimulator.org/Resources/USBR/7D/Final/Comments2020Nov/7DReportCommentsLivingRivers.pdf</a>

Drought Response Operating Agreement (DROA); Lower Basin	No opportunity provided for public participation
DROA 01; Upper Basin	<a href="http://www.riversimulator.org/2025Guidelines/USBR/DROAub/DROAcommentsLRandCBD2022Jan21.pdf">http://www.riversimulator.org/2025Guidelines/USBR/DROAub/DROAcommentsLRandCBD2022Jan21.pdf</a>
DROA 02: Upper Basin	<a href="http://www.riversimulator.org/2025Guidelines/USBR/DROAub/DROAubCommentLetterLR2022Feb.pdf">http://www.riversimulator.org/2025Guidelines/USBR/DROAub/DROAubCommentLetterLR2022Feb.pdf</a>
Post-2026 Pre-scoping	<a href="http://www.riversimulator.org/2025Guidelines/PreScoping/PrescopeComments/LRetalPrescopingCommentsToReclamation31August2022.pdf">http://www.riversimulator.org/2025Guidelines/PreScoping/PrescopeComments/LRetalPrescopingCommentsToReclamation31August2022.pdf</a>

**I. INTRODUCTION**

The signatories of this scoping letter include stakeholders of various water delivery projects authorized by Congress in the 20th century and managed by Reclamation. These organizations also take interest in the ecosystems, species, habitats, and cultural landscapes that depend on the Colorado River and its tributaries throughout the basin.

Water scarcity is the prevailing need and purpose for this Post-2026 EIS in both the Upper and Lower Basins. Water scarcity in the Colorado River Basin (CRB) was the motivation for Lower Basin development in 1928 (Boulder Canyon Project Act) and Upper Basin development in 1956 (Colorado Rivers Storage Project Act), time has shown that building more dams did not solve the water scarcity problem.

We note there is growing imbalance between human demands and the natural supply, which is stressed by the acceleration of climate disruptions. There is a real risk of catastrophic collapse and system failure in the CRB in the near-future.

The next 120 years of the so-called Reclamation Era<sup>1</sup> will be very, very different than the past. Reclamation appears to acknowledge this in the Notice which carries encouraging statements for developing new operating criteria in the CRB:

- Support proactive management strategies.

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<sup>1</sup> Speech by Reclamation Commissioner Gilbert G. Stamm in 1973 to California Water Resources Association. <http://www.riversimulator.org/Resources/Planning/ReclamationOverviewNationalWaterCommission1973Stamm.pdf>

- Avoid crisis-by-crisis management.
- Create more robust and adaptive strategies
- Incorporate a more holistic, resilient approach.
- Focus on long-term sustainability for citizens and the natural environment.
- Minimize system vulnerabilities.

During the three scoping webinars we were also encouraged by the following statements shared by Reclamation and the NEPA contractor, SWCA and Associates, and as follows:

- Develop alternative paradigms for coordinated reservoir elevations.
- Develop engagement opportunities with stakeholders, tribes, and the public.
- Develop education and outreach opportunities with stakeholders and tribes.

Despite these encouraging statements, we are also skeptical for the following reasons based on past Reclamation decision-making:

- Since 1922, the self-interest displayed by the seven states has impeded the emergence of holistic concepts.
- The public has submitted holistic strategies, as they did during scoping in 2005 for the Shortage Criteria EIS, that Reclamation ignored.
- In 2006, Reclamation defaulted to the alternative submitted by the seven states and dismissed the diverse strategies from the public.
- Reclamation's deference to the states has proven to be the wrong choice because the preferred alternative drained reservoirs Mead and Powell and created a shortage declaration well-before the expiration date of 2007 Interim Guidelines (Year 2026).<sup>2 3</sup>
- The preferred alternative in the Lower Basin in 2007 did not address the structural deficit (evaporation to the points of diversion), which would have reduced their demand schedule by 1.2 million acre-feet (this evaporation number will increase in the future).
- The Upper Basin's preferred alternative in 2007 granted a depletion schedule that would incrementally increase system demands by one million acre-feet.
- Investments in system efficiencies justified the preferred alternative that unified the seven states. However, the efficiencies did not account for increased warming,

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<sup>2</sup> Archived press release; February 13, 2008; Larry Dozier, Deputy General Manager of Central Arizona Project; "Lake Mead Not Going Dry." <http://www.riversimulator.org/Resources/Press/LakeMeadDryCAPdozierFulp.pdf>

<sup>3</sup> When will Lake Mead Go Dry? Barnett and Pierce, 2008. <http://www.riversimulator.org/Resources/ClimateDocs/2008BarnettPierce.pdf>

aridification and other climate disruptions, which led us to the current failed state of management.

- The supplemental strategies since 2007 didn't close the widening gap of system demand, namely the Pilot System Conservation Program of 2014, Drought Contingency Planning in 2019 (DCP) and the Drought Response Operations Agreement of 2021 (DROA).
- In 2022, Reclamation initiated a Supplemental EIS (SEIS) process for the public to submit holistic and sustainable concepts to Reclamation.
- In 2023, Reclamation again yielded to an untimely proposal from the seven states with goals that were off-target, and suspending the SEIS process.

In light of this history, we are concerned that Reclamation will once again allow the states to monopolize the environmental review particularly in the formulation of meaningful alternatives, which in the past led Reclamation to the dismiss citizen and tribal proposals. The interests of the States should not be able to dominate and preclude consideration of Tribal water rights and environmental issues including instream needs for native fish and riparian resources or alternatives that include bypass or decommissioning of Glen Canyon Dam.

We are also concerned that some of the interim strategies and agreements including the so-called "intentionally created surplus," the DCP, and the other credit/surplus systems are not viable and could exacerbate future shortages. Reclamation's modeling for the EIS should look how any "calls" on that "credit" from all these agreements could affect the system as a whole. If this analysis is done, we believe it will be clear that the current credit/surplus structure is unworkable without additional sideboards and limitations.

If the preferred alternative for this EIS resembles the failed strategies of 2007, 2014, 2019, and 2021, then it is very reasonable to expect that the Record of Decision for the Post-2026 Operations will expedite system collapse and provoke public ire. We hope that this Post-2026 EIS process will be more robust and transparent than the NEPA reviews Reclamation has undertaken in the past. The scope of the analysis should be basin-wide and include Upper Basin dams that Reclamation has used to manage water shortages at Lakes Mead and Powell per the 2007 Interim Agreements and other agreements. Reclamation must start with a baseline that takes into account the water needed to preserve the ecosystem, endangered fish recovery, structural deficits due to evaporation and seepage, and reserved tribal water rights. A NEPA analysis of this sort fully considers alternatives that may include decommissioning existing dams to reduce water loss and impacts to the environment.

## **II. Scope of the Environmental Review**

### **A. Geographic Scope**

The analysis cannot be limited to operations of Glen Canyon Dam and Hoover Dam because those operations and contingency measures also involve the Bureau of Reclamation's operations at Flaming Gorge Dam, Blue Mesa Dam and Navajo Dam, which are utilized to avoid system risk and uncertainty. For example, in recent years changes in operations at these upper basin dams have been used to prevent the outlet works at Glen Canyon Dam from declining below targeted levels to shore up hydropower operations and protect equipment.

The scope of the Endangered Species Act consultation for the post-2026 operational guidelines must also consider all of the impacts of dam operations. Reclamation must consult with US Fish and Wildlife about the Biological Opinions for all the above mentioned federal dams in the upper basin as well as all operations affecting the lower basin species—the whole of the Colorado River and its tributaries that are affected by BOR operations. This would include, for example, an updated Biological Opinion for the Multi-Species conservation program in the reaches of the Lower Basin below Hoover Dam.

### **B. Issue Areas for Environmental Review**

#### **1. Baseline Water Use For Analysis**

- a. Baseline Must Include All Reserved Water Rights for Tribes and Reserved Water Rights For Federal Lands
- b. Baseline Should Not Include the Upper Basin Depletion Schedule — only Perfected Rights

#### **2. Future Estimated Water Flows and Water Availability Estimates Used for the Analysis Must Include Realistic Predictions in Light of Climate Change and Aridification including Increasing Losses to Evaporation from Storage**

The Upper Basin Hydrologic Determination must be modified to reflect the current 30-year average. Reclamation cannot continue to ignore the structural deficit and evaporative losses which will increase in the future. Reclamation must also analyze all relevant science, especially including worst case scenarios for aridification flow declines. Reclamation must develop plans and strategies to limit Upper Basin Water use rather than increase it.

### 3. Endangered Fish Survival and Recovery Amidst Aridification

Under both NEPA and the ESA, Reclamation must consider effects on survival and recovery of endangered fish in the Colorado River system, and, in the context of this EIS and its accompanying Biological Opinion, must proactively plan infrastructure and flows to facilitate endangered fish recovery amidst aridification and climate-inevitable dead pool conditions.

- a. ***Given the relative lack of warm water non-native fish in the Colorado River through Grand Canyon, and given the downstream fish barrier that Pearce Ferry rapid may provide, the Bureau of Reclamation, National Park Service, and U.S. Fish and Wildlife Service should plan now for managing the Colorado River through Grand Canyon National Park as a stronghold for endangered fish recovery amidst aridification, inevitable dead pool conditions, and a warm Colorado River through Grand Canyon.***

Reclamation and its sister agencies must ensure that the Colorado River through Grand Canyon remains relatively free of nonnative warm water invasive fish. The Colorado River through Grand Canyon is unique in the CRB for its relative lack of non-native warm-water fish. These fish, like smallmouth bass, catfish, and other species, pose a pronounced, ongoing threat to endangered fish that overwhelms and negates the provision of adequate habitat conditions.

Thus, the lack of nonnative warm water fish in the Colorado River through Grand Canyon creates a unique opportunity for endangered fish recovery in Grand Canyon, where: (1) together, the downstream fish barrier that Pearce Ferry may provide and an upstream barrier at the current site of Glen Canyon Dam, can provide for ongoing exclusion nonnative warm water fish from the Grand Canyon, and (2) in the relative absence of nonnative warm water fish, endangered fish may flourish in the Colorado River throughout all of Grand Canyon as aridification continues and the river warms, as has occurred in recent years in western Grand Canyon.

Given the climate inevitability of Glen Canyon Dam's obsolescence, Reclamation and its sister agencies must analyze in the context of this EIS and its accompanying Biological Opinion bypass and other post-dam river management systems at the current site of Glen Canyon Dam that, across alternatives, prevent passage of non-native fish downstream into the Colorado River through Grand Canyon to ensure the survival and recovery of endangered fish. Conversely, Reclamation's failure to prevent non-native fish invasion amidst a warming Colorado River through Grand Canyon will jeopardize endangered species like humpback chub.

- b. *BOR must consider current and ongoing effects of the lack of screens or other dam modifications to prevent passage of non-native fish through Glen Canyon Dam into the Colorado River and Grand Canyon.***

Reclamation's operation of Glen Canyon Dam absent screens or other barriers to prevent non-native fish passage through the dam and into the Colorado River in Grand Canyon is discretionary action because the Bureau and the U.S. Fish and Wildlife Service have, since at least 2016 (1) been aware of the potential for non-native fish to pass through Glen Canyon Dam and into the Colorado River and designated critical habitat for humpback chub, particularly as the result of aridification and declining Lake Powell surface elevations, and (2) been aware and discussed the need to implement screens or other barriers on Glen Canyon Dam to prevent passage of non-native warm water fish into the Colorado River and designated critical habitat for humpback chub. The EIS must fully consider the need for screens under all operations scenarios as well as a decommissioning alternative (as detailed below).

- c. *Adaptive Management and Mitigation for Upper Basin Fish:***

ESA Consultation for the post-2026 operations should include all 5 dams—consolidating the issues regarding listed fish in one consultation and Biological Opinion. Adaptive management structure has not achieved desired outcomes and the RIPRAP for fish protection in Upper Basin is opaque to the public. If management of all 5 dams (Hoover, Glen Canyon, Flaming Gorge, Blue Mesa, and Navajo) is consolidated together (which we suggest) with a comprehensive Biological Opinion, Reclamation may not need the separate RIPRAP decision-making structure and the required actions to support survival and recovery of listed fish would be more clearly defined and more transparent to the public.

- d. *BOR, FWS, and NPS must analyze, monitor, and plan for the survival and recovery of threatened and endangered species occupying and/or re-occupying newly emergent portions of Glen Canyon and its tributaries.***

As aridification continues and Lake Powell recedes, rapid recovery of newly emergent canyon-bottom riparian habitats and their associated aquatic ecosystems will be occupied and re-occupied by threatened and endangered species. The EIS and Biological Opinion must therefore analyze and provide for the survival and recovery of threatened and endangered species re-occupying newly emergent portions of Glen Canyon. Federal agencies should therein set forth plans for monitoring, detecting, and managing threatened and endangered species as they re-occupy newly emergent



portions of Glen Canyon and its tributaries. The EIS and Biological Opinion should prohibit re-submersion of habitats newly occupied by threatened and endangered species.

#### **4. Riparian and Aquatic Habitat Issues**

As part of the EIS review, direct, indirect and cumulative impacts to riparian and aquatic habitats from operations must also be fully considered. Changes in water flow and seasonal releases can have profound affects on riparian and aquatic habitats, the species that depend on them, water temperature, stream structure and other factors that must be fully considered in the EIS.

#### **5. Cultural Values**

As aridification continues and Lake Powell recedes, newly emergent portions of Glen Canyon will reveal long-submerged cultural sites, such as rock art panels, granaries, habitation, and other sites. The EIS must analyze and provide for protection and conservation of those sites, consistent with applicable laws, as they emerge. The EIS must specifically analyze measures to protect sites against re-submersion and, in the absence thereof, the effects of repeated saturation and drying cycles on the integrity of cultural sites.

### **III. Alternatives that Should be Considered**

#### **A. Worst Case Scenario Alternative: Protecting the Ecosystem As Flows Decline**

Reclamation must analyze and plan for worst-case scenarios for Colorado River flow declines given ongoing and anticipated future climate warming, regional aridification and consider ways to ensure the protection of the Colorado River ecosystem and not just dam operations. In providing robust and adaptive considerations, besides producing an operational strategy to avoid shortages and/or avoid a run of the river condition throughout the system of reservoirs, as Reclamation has proposed, the agency must set forth triggers and corresponding emergency plans to avoid a collapse of the ecosystem.

#### **B. Alternatives Under Various Depletion Schedules and With Elimination of the Structural Deficit (evaporation)**

The Bureau must analyze a range of depletion schedules, including:

- (1) an alternative that eliminates the structural deficit;
- (2) an alternative that prohibits any new Upper Basin Depletions or diversions from the baseline of current use and excludes the “depletion schedule”

- (3) an alternative that ensures tribes receive and can utilize reserved water rights needed for their permanent homelands and to protect the environment. This alternative must consider a scenario in which reserved water is used in various ways, including for development and for instream support of ecosystems.

### **C. Alternatives that Consider Changes in Physical Infrastructure**

The physical infrastructure of the Colorado River Basin dams is antiquated and, unless changed dramatically and quickly, damage to ecological and social systems will be severe and irreparable. To avoid these outcomes, Reclamation should analyze:

#### **1. One-Dam Solution Alternative**

A similar alternative was originally submitted during scoping for the Shortage Criteria EIS of 2005 and called The One-Dam Solution includes:

- Reducing the use of inefficient above-ground water storage facilities, while expanding the use of underground storage to minimize evaporation losses. Regional aquifers could provide greater storage capacity than Lake Powell and Lake Mead combined.
- Employ Lake Mead as the principal water storage and distribution facility for water delivery to the lower basin states. Lake Powell storage is resulting in unnecessary evaporative losses to a limited water supply.
- Employ Lake Mead as the starting point for transporting sediment around the lower Colorado River system.<sup>4</sup>

As system crisis is imminent and remedies are urgently needed, this proposed alternative addresses critical issues that must be considered in the DEIS:

- The legal structure in the CRB simultaneously creates solutions and looming problems.
- Though the legal structure is based on priority, the critical needs of the natural environment are displaced, as are the needs of the First Nations and equity in fulfilling reserved water rights.
- Additionally, the infrastructure that was built for solutions also caused looming problems. Therefore, past generations received the benefits at reasonable costs —while future generations will inherit the inequities and looming problems and at

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<sup>4</sup> The One-Dam Solution; Living Rivers & Colorado Riverkeeper, July, 2005. <http://www.livingrivers.org/pdfs/TheOne-DamSolution.pdf>

greater costs. The DEIS must consider an alternative that is more equitable and provides long-term solutions for future generations.

## **2. Glen Canyon Bypass Alternative and Decommissioning and Mitigations Alternative**

Ongoing and anticipated future climate warming, regional aridification, and Colorado River flow declines require a plan from Reclamation for dead pool conditions at Lake Powell, and Glen Canyon Dam obsolescence, during the horizon of this planning process. The Bureau must plan now for decommissioning Glen Canyon Dam and analyze a range of corresponding engineering alternatives for doing so. The Bureau must ensure that all engineering alternatives for decommissioning Glen Canyon Dam are designed to prevent passage of non-native fish into the Colorado River in Grand Canyon National Park.

The Bureau should, therefore, analyze an alternative or alternatives that (1) accept and plan for the inevitable obsolescence of Glen Canyon Dam and the end of hydropower production therefrom, (2) provide engineering solutions to manage and/or decommission Glen Canyon Dam as run of the river, such as and including bypass, and that (3) provide protections and barriers that prevent nonnative fish from entering Grand Canyon from upstream and impacting endangered fish downstream. Reclamation must analyze a range of design alternatives for preventing passage of non-native fish into the Colorado River in Grand Canyon. Reclamation should analyze bypass / nonnative fish barrier alternatives in the NEPA process, as emergency mitigation for Grand Canyon's endangered fish in the event of dead pool, and as a long-term management and engineering solution for the climate-inevitable obsolescence and decommissioning of Glen Canyon Dam.

## **3. Bureau of Reclamation must analyze options for replacement power for decommissioning Glen Canyon Dam**

Replacement power can be found both through conservation and efficiency measures and through implementing renewable energy projects paired with electric storage. Such projects in the areas currently serviced by the Glen Canyon Dam hydropower could include, but are not limited to, creative solutions such as installing solar panels on the Central Arizona Project to reduce evaporation and generate new clean energy.

#### **IV. STRATEGIES FOR PREPARING THE EIS AND IMPLEMENTING NEW OPERATIONAL DECISIONS**

##### **A. Process and Scope should be expanded.**

We urge the Bureau to embrace the following suggestions for the upcoming NEPA process:

1. Provide more in-person and virtual meetings at multiple locations in each basin state of USA and Mexico to ensure a robust review of the DEIS, FEIS and ROD..
2. The scope of the analysis must be comprehensive, programmatic and basin-wide in scope (including Upper Basin dams and the counties with trans-basin and intra-basin diversion projects in existence and new proposals).
3. Assess and disclose the costs for full implementation of mitigation and adaptive management programs along with operations. Reclamation will need to ask Congress for consistent funding to implement post-2026 programs necessary to fulfill management responsibilities outlined in the Record of Decision.
4. Enlist the National Academy of Sciences to run focus groups regarding climate adaptation strategies and environmental effects of operations.
5. Enlist the Center for Climate Adaptation Science and Solutions (CCASS) at the University of Arizona to partner on the development of strategies that attract sustainability solutions.<sup>[5]</sup>
6. Collaborate with the US Geological Survey<sup>6</sup> and Surface Atmosphere Integrated Field Laboratory<sup>7</sup> for base flow analyses and additional groundwater assessments, including flow modeling, resource monitoring, eDNA sampling, and isotopic data collection.
7. Build models predicated on non-stationarity weather patterns.
8. Outline schedules of Lower Basin and Upper Basin curtailments.
9. Prepare for curtailments caused by climate extremes that may be required to favor senior water rights in the Lower Basin and analyze those potential effects on the environment. See U.S. Supreme Court's 2006 decree in *Arizona v California*.
10. List the schedule of priority rights in the Upper and Lower Basin to give the public a better understanding of the differences between the two basins. We believe this will highlight a significant discrepancy in record keeping.
11. Account for all proposed dams and diversions on all tributaries and the main stem to help the public better understand future depletions that could affect the outcomes considered in the DEIS.

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<sup>5</sup> Center for Climate Adaptation Science and Solutions (CCASS). <https://ccass.arizona.edu/themes/water-security-planning-and-policy/colorado-river>

<sup>6</sup> Colorado River Basin Focus Area Study. <https://www.usgs.gov/mission-areas/water-resources/science/colorado-river-basin-focus-area-study>

<sup>7</sup> Surface Atmosphere Integrated Field Laboratory (SAIL). <https://sail.lbl.gov>

12. Outline all mitigation programs currently financed by hydropower revenues and provide reports on outcomes.
13. Reassess the effect of sediment mobilization at Lake Powell on storage, recreation, wildlife habitat, water quality, water temperature and other such impacts related to Glen Canyon Dam operations.
14. Outline and assess costs and feasibility of abandoned recreational infrastructure at Lakes Mead and Powell.
15. Outline and assess new recreational opportunities at places such as Glen Canyon and Lake Mead NRAs if the system operations change.
16. Assess and evaluate the cumulative impacts of increasing aridity upon habitat for endangered species and water availability.
17. Perform CRB vegetation assessments that highlight the status of invasive, non-native and native species on water quantity and quality.
18. Consider new thresholds for tier measurements for implementing curtailment/shortage schedules.

**B. Use of Colorado River Simulation System (CRSS) and Colorado River Mid-term Modeling System (CRMMS) for Modeling Must Look at a Broader Range of Assumptions and Inputs**

The modeling paradigm Reclamation is using may not be sufficient to address a changing future. In addition we suggest that other inputs and assumptions must be looked at and should be run through the models including a inputs that account for the structural deficit (seepage and evaporation) and assumptions that do not include new Upper Basin diversions under the depletion schedule.

For modeling climate projections and creating scenario planning exercises, we suggest the following criteria for base flow and snow melt volumes at Lee's Ferry, Arizona (Compact Point). The framework should be vetted with the community of physical and social scientists who understand all the physical characteristics of the CRB. The baseline of supply data from 1906 to 2021, is not representative of the effects of anthropogenic warming. The current 30-year average is the only acceptable baseline for long-term planning.

***a. Modeling the natural flow in the 21st century***

1. Scenario One (control): The current 30-year average of 9.6 million acre-feet (2021) for inflows into Lake Powell.
2. Scenario Two: The projected 30-year average in 2051.<sup>8</sup>

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<sup>8</sup> Overpack and Udall; 2020, PNAS. <http://www.riversimulator.org/Resources/ClimateDocs/ClimateChangeAndAridificationOfNorthAmerica2020Overpeck.pdf>

### 3. Scenario Three: The projected 30-year average of 2081.<sup>9</sup>

#### ***b. Modeling for global temperature increases in the 21st century***

Present-day monitoring data of carbon molecules hovering in the atmosphere clearly indicates that, since the first Conference of the Parties (COP) held in Germany in Year 1995, absolutely no progress has been made to reduce or sequester global carbon emissions.<sup>10</sup> Therefore, the work completed for 2007 to demonstrate possible reductions in temperatures for scenario planning between 2005 and 2060 was not helpful to the formulating the 2007 Interim Guidelines, nor to the public.

Optimistically, we propose the following criteria for scenario planning:

1. Scenario One (the control): The business-as-usual trend of rising temperatures that continue unabated to Year 2101.
2. Scenario Two: The trend actually stabilizes by Year 2051.
3. Scenario Three: The trend begins to reverse itself by Year 2081.

The above example is a plain language approach, which is necessary because previous narratives and graphics for the public consumption of this information was either too vague or too busy. The writers of this NEPA process should explain to the public that efforts to reduce greenhouse gases and cool the atmosphere and ocean have lag times that last many centuries. Consider, for example, that the temperature regimes of the Medieval Warm Period and the Little Ice Age were persistent for time periods that lasted three to four centuries.<sup>[5]</sup>

In other words, we need to accept that the negative impacts of climate change will not reverse in this century, i.e., that the ocean will continue to rise and the Arctic tundra will continue to thaw.

#### **C. INCORPORATE TRADITIONAL KNOWLEDGE AND WISDOM FROM THE TRIBAL COMMUNITY VISION: THE WATER AND TRIBE INITIATIVE AND THE BLUFF PRINCIPLES**

When Reclamation convenes the promised engagement meetings with the tribes, we recommend that baseline and holistic discussions follow the Bluff Principles, which

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<sup>9</sup> Barnett and Pierce

<sup>10</sup> Carbon dioxide data at Mauna Loa Observatory. <https://keelingcurve.ucsd.edu/>

emerged from a series of conversations among Hopi, Ute and other tribal leaders in Moab and Bluff, Utah, in 2016.<sup>11 12</sup> Many of these suggestions will help to define the goals to achieve sustainability and resiliency, as mentioned in the Notice of Intent.

1. Clean water for all peoples.
2. Honoring sacred sites and the religious beliefs of all peoples.
3. A holistic approach to water management that focuses on the ecosystem.
4. Educating the public on the value of water: water is life.
5. Using science to improve our understanding of water quality and quantity.
6. A focus on collaborative, inclusive policymaking.
7. A water regime free of racism and prejudice.
8. An ethic that emphasizes concern and caring for everyone, downstream and upstream.
9. A goal of stewardship; leave the Earth and its water systems better than we found them.
10. Equity and fairness should be basic features in all water allocation decisions.
11. Understand that traditional wisdom, especially from the Elders, is critical.
12. A sense of urgency; we must act now before the problems become overwhelming. I
13. We must think of the welfare of future generations, not just for our own time.
14. Water is a gift provided by the Creator and should be sacred, shared, and loved.

#### **D. ADDRESS SYSTEM VULNERABILITIES AND IMPLEMENTING CLIMATE ADAPTATION STRATEGIES**

##### **Center for Climate Adaptation Science and Solutions (CCASS)**

Beginning in October of 2017, several science meetings were convened at CCASS at the University of Arizona at Tucson, and convened by its director, Professor Kathy Jacobs.

The 35 scientists (including Reclamation staff) that were convened for this gathering articulated the system's vulnerabilities in great detail. In many ways, their report may be

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<sup>11</sup> A Common Vision for the Colorado River System: Toward a Framework for Sustainability; 2022, Policy Brief 3; Water and Tribe Initiative. <http://www.riversimulator.org/Resources/Tribes/WTI/TribalVisionAndBluffPrinciples2022PolicyBrief3WTI.pdf>

<sup>12</sup> Community in the Colorado River; Jason Robinson, Matthew McKinney and Daryl Vigil; 2021, Idaho Law Review. <http://www.riversimulator.org/Resources/LawOfTheRiver/CommunityInTheColoradoRiverBasin2021RobisonIdahoLR.pdf>

the best scoping document for the Post-2026 EIS, and this document is linked below for your convenience and this document will be submitted for the administrative record.

**Reference:** Colorado River: Building a Science Agenda; Final Workshop Report; Sponsored by the National Science Foundation Award Number 1644884, and the Janet Quinney Lawson Foundation; Oct. 10-12, 2017. <http://www.riversimulator.org/Resources/University/CCASS/October2017ColoradoRiverWorkshopReport.pdf>

## **E. ADDRESS THE INEVITABLE FAILURES IN INFRASTRUCTURE**

The academic community recognizes that 20th Century Infrastructure likely won't serve its intended purposes by the end of the 21st Century. Reclamation must consider these realities in the DEIS, demonstrating to the public that we are preparing for a future with fewer reservoirs and hydropower units.

It is refreshing to see scholarship that iterates what certain NGOs have been saying for decades. Now, Reclamation must follow suit, accepting those potential outcomes and including alternatives in the DEIS that reflect the likelihood of events Americans may soon face.

Wheeler et al (2021) explained that combined storage in Lake Mead and Lake Powell will rarely exceed 50% of capacity — which will create a scenario that forces society to choose between protecting the natural environment or continuing to generate hydro-power at certain facilities.<sup>13</sup> Reclamation must address this reality in the DEIS and consider significant reductions in hydropower in the alternatives.

Schmidt et al (2023) further explain that declining natural run off and “increasing evapotranspiration and dry soils associated with global climate change” mean it is highly likely there will be far less water to be stored in the basin in the future. As a result:

“To stabilize reservoir storage, basin-wide use needs to equal modern runoff. To recover reservoir storage, basin-wide use needs to decline even more. Based on 21st century average runoff, a 13%–20% decline in basin-wide use would allow for stabilization and some reservoir storage recovery. Future policy debate about reservoir operations will inevitably concern whether most, or all, reservoir storage should be in Lake Mead or in Lake Powell. The choice of one or the other will result in significantly

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<sup>13</sup> Wheeler, K., Kuhn, E., Bruckerhoff, L., Udall, B., Wang, J., Gilbert, L., Goeking, S., Kasprak, A., Mihalevich, B., Neilson, B., Salehabadi, H., & Schmidt, J. C. (2021). Alternative management paradigms for the future of the Colorado and Green Rivers. Utah State University Center for Colorado River Studies white paper no. 6 (p. 90). [https://qcnr.usu.edu/coloradoriver/files/CCRS\\_White\\_Paper\\_6.pdf](https://qcnr.usu.edu/coloradoriver/files/CCRS_White_Paper_6.pdf)



different environmental and recreational outcomes for Glen Canyon and the Grand Canyon.”<sup>14</sup>

Reclamation can no longer pan as taboo or radical a reservoir management system that entirely abandons reservoir storage in Lake Powell. It is in the mainstream channels of academic research, scholarship and discourse.

**F. NEW SCIENCE AND RESEARCH THAT MUST BE CONSIDERED**

We have compiled recent science and research relevant to the analysis needed in the DEIS. The list below and the attached documents supplement the other research we provided in earlier comments.

<p><a href="#">2023 - Aridification of Colorado River Basin's snowpack regions has driven water losses despite ameliorating effects of vegetation.</a> Bass.</p> <p>Authors find that the CRB has 10% less water due to warming since the 1880s.</p>	<p><a href="#">2023 - The Colorado River water crisis: Its origin and the future.</a> Schmidt.</p> <p>Based on 21st century average run-off, a 13%–20% decline in basin-wide use would allow for stabilization and some reservoir storage recovery.</p>
<p><a href="#">2023 - An historical perspective on the accounting for evaporation and system losses in the Lower Colorado River Basin.</a> Kuhn.</p> <p>Water management of the Lower Colorado River has long sidestepped the questions of how to account for and assess the impact of reservoir evaporation and system losses.</p>	<p><a href="#">2023 - A survey of the Bureau of Reclamations Decree Accounting Reports in the Lower Colorado River Basin.</a> McCoy for ASCE.</p> <p>As climate change continues to constrain Colorado River water supply, detailed accounting may help reveal areas for potential efficiencies or demonstrate where the greatest levels of savings have been reached while ensuring that environmental and social benefits are preserved.</p>

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<sup>14</sup> Schmidt, J. C., Yackulic, C. B., & Kuhn, E. (2023). The Colorado River water crisis: Its origin and the future. WIREs Water, e1672. <https://doi.org/10.1002/wat2.1672>

<p><a href="#">2022 - Causes of Missing Snowmelt Following Drought</a>. Lapides for AGU.</p> <p>Depleted moisture storage reduced in 2021 forecasts from 60% to 20% at 15 minimally disturbed basins and from 18% to 2% at 6 water supply basins in the Sierra Nevada.</p>	<p><a href="#">2022 - What will it take to stabilize the Colorado River?</a> Wheeler.</p> <p>Current policies are inadequate to stabilize the Colorado River, but vigorous consumptive use strategies can stabilize the system.</p>
<p><a href="#">2022 - An Assessment of Potential Severe Droughts in the Colorado River Basin</a>. Salehabadi. &amp; <a href="#">xlsx data sheets</a>.</p> <p>Modeling scenarios indicate considerable periods when Lake Powell falls below its hydropower penstocks, indicating a need to rethink management during these critical conditions.</p>	<p><a href="#">2022 - Characterizing drought behavior in the Colorado River Basin using unsupervised machine learning</a>. Talsma et al.</p> <p>We show that areas of the Upper CRB could experience a large reduction in available water for evapotranspiration.</p>
<p><a href="#">2022 - Rapid Intensification of Emerging Southwestern North American megadrought in 2020 - 2021</a>. Williams.</p> <p>Exceptional drought severity in 2021, ~19% of which is attributable to anthropogenic climate trends, 2000–2021 was the driest 22-yr period since at least 800 A.D.</p>	<p><a href="#">2021 - Concurrent Changes in Extreme Hydroclimate Events in the Colorado River Basin</a>. Bennett.</p> <p>Our results indicate that concurrent extreme hydroclimate events are projected to increase in the future and intensify within critical regions of the Colorado River basin.</p>
<p><a href="#">2021 - Colorado Water: Climate Change and Adaptation</a>.</p> <p>Climate documents compiled by Brad Udall and Jonathan Overpeck and useful for the administrative record.</p>	<p><a href="#">2020 - Large Contribution From Anthropogenic Warming to Emerging North American Megadrought</a>. Williams.</p> <p>Anthropogenic trends in temperature, relative humidity, and precipitation estimated from 31 climate models account for 47% (model interquartiles of 35 to 105%) of the 2000–2018 drought severity,</p>

2023 - [The Colorado River water crisis: Its origin and the future](#). Schmidt.

The authors note actual reductions in use would be necessary to stabilize the current system and recovery is unlikely even if there are some wet years.

## V. WATER SHORTAGES WERE PREDICTED

Reclamation has historically ignored well founded predictions that the basin would have far less water in the future. There are lessons to be learned from those mistakes. We offer this look-back at some key studies to encourage Reclamation to look with fresh eyes at the current state of the basin in this DEIS. This is in stark contrast to the outdated assumptions long relied upon by Reclamation regarding water availability and management. The Colorado River is a living ecosystem that must be maintained and restored — not a series of pipes and tubes.

Wallace Earle Stegner supported holistic water resource planning efforts since the writing of his Master's thesis about Clarence E. Dutton, and his biography about the career of John W. Powell. Along with Grove K. Gilbert and Almon H. Thompson, these four scientists from the 19th century understood the limitations of geography and climate in the arid lands of the western USA, and thoughtfully prepared a document for the consideration of Congress in 1878, and called *Report on the Lands of The Arid Region of the United States*. These concepts were largely rejected by Congress and, as many historians concluded, are among the first national missteps in the management of water resources on a continental scale.

To this day, this nation does not have an equitable national water policy, nor do we incorporate sustainability and resiliency into a regional EIS in the Colorado River Basin. The EIS writing team for this analysis needs assistance from skilled academics and from the traditional knowledge that the tribes have possessed since time immemorial.

### ***a. The Energy Security Act of 1980: Response from the National Academy of Sciences, and by Roger R. Revelle and colleagues from The Scripps Institute of Oceanography.***

Reclamation can no longer ignore the harsh facts climate change imposes — nor can it ignore the effect of industries outside the purview of its regulatory capacity.

In the early 1980s there were concerns about the energy policy discussions that were underway, and specifically about developing the reserves of oil shale and oil sands in the Upper Basin states of the CRB: specifically in southwest Wyoming, northeast Utah and northwest Colorado.

The former science advisor to Interior Secretary Stewart Udall (1961 to 1969), Roger Revelle, PhD, worried about the massive domestic energy source unnecessarily accelerating the loading of greenhouse gases into the atmosphere by the mass production of a low-value fossil fuel that requires excessive amounts of water and energy to develop, process, and distribute.

Revelle and his colleagues had determined by 1956 that the ocean had already reached its limit at absorbing carbon molecules from the atmosphere. This assessment incited the installation of the carbon dioxide monitoring station at Mount Mauna Loa, Hawaii in 1958. This data documents the correlation between greenhouse gas emissions and the generation of excessive heat inputs that have subsequently disrupted the circulation patterns of ocean and atmosphere.<sup>15</sup>

The following three papers were written by the original committee members of the National Research Council in 1983, which require the attention of the writers of this Post-2026 EIS. The committee members back then included Roger R. Revelle, Paul Waggoner and Timothy P. Barnett. Since these gentlemen are no longer living, we suggest the EIS writers reach out to Daniel Cayan and David Pierce at The Scripps Institute in La Jolla, California. Many of the suggestions in these documents (below) resemble the goals and objectives that our found in the Notice of Intent for this EIS.

- A. National Research Council 1983. Changing Climate: Report of the Carbon Dioxide Assessment Committee. Washington, DC: The National Academies Press. <https://doi.org/10.17226/18714>.
- B. Effects of a Carbon Dioxide-Induced Climatic Change on Water Supplies in the Western United States (Chapter 7) by Roger R. Revelle and Paul E. Waggoner, 1983. <http://www.riversimulator.org/Resources/ClimateDocs/EffectsOfACarboInducedClimaticChangeOnWaterSuppliesInTheWesternUSARevelle1983.pdf>

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<sup>15</sup> Revelle, Roger and Suess, Hans E., *Carbon Dioxide Exchange Between Atmosphere and Ocean and the Question of an Increase of Atmospheric CO<sub>2</sub> during the Past Decades*, Scripps Institution of Oceanography, University of California, 1957. <http://www.riversimulator.org/Resources/ClimateDocs/CarbonDioxideExchangeBetweenAtmosphereOceanIncreaseOfAtmosphericCO2Revelle1957.pdf>

- C. Sustainable water deliveries from the Colorado River in a changing climate. Tim P. Barnett. Proceedings of the National Academy of Sciences, 2009. <http://www.riversimulator.org/Resources/ClimateDocs/PierceBarnett2009.pdf>

## **VI. CONCLUSION**

Again, we thank you for this opportunity to share our concerns and insights with Reclamation staff and SWCA and Associates. We look forward to reviewing a robust EIS that fully addresses the issues raised in these comments, which are of critical importance to the future of the Colorado River ecosystem.

In closing we submit a brief summary of the critical issues that must be addressed in this EIS, and as follows:

The need and purpose of this EIS is to reduce consumption, significantly, and better prepare our communities, ecosystems and cultural landscapes for a Colorado River System with significantly less water. There must be a legally compliant, basin-wide approach to reducing consumptive uses and prohibiting new diversions of the dwindling system. Reclamation and the seven states must not fall victim to heuristics. If past behavior is any indicator, allowing the seven states to control the process will lead to system failures, harm to tribal water rights, and impacts to the public interest, especially the environment. Reclamation can no longer ignore the scholarship and the real-world signals demonstrating that 20th Century infrastructure is not prepared for 21st Century hydrology, which is rapidly changing as a consequence of anthropogenic climate change.

We will be happy to provide any insights and to work with Reclamation on developing our vision for a more sustainable, resilient river.

In the near future, we intend to send more detailed comments via email. We will also submit relevant documents that support the comments we will be sharing with you.

Very truly yours,

John Weisheit, Living Rivers and Colorado Riverkeeper  
Taylor McKinnon, Center for Biological Diversity  
Kyle Roerink, Great Basin Water Network  
Tom Martin, River Runners for Wilderness  
Tick Segerblom, Las Vegas Water Defender  
Gary Wockner, Save The Colorado

Eric Balken, Glen Canyon Institute  
Zach Frankel, Utah Rivers Council  
Kate Hudson, Waterkeeper Alliance

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