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Memorandum

To: Wayne Pullan, Regional Director, Upper Colorado Basin, Bureau of Reclamation
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Genevieve Johnson, Project Manager, Bureau of Reclamation

From: Kate Hammond, Acting Regional Director, Interior Regions 6,7,8, NPS
Frank Lands, Regional Director, Interior Regions 8,9, 10 and 12, NPS

Subject: National Park Service Comments in response to the November 17, 2022 Federal Register Notice of Intent to Prepare a Supplemental Environmental Impact Statement for the 2007 Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead

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The National Park Service (NPS) appreciates the opportunity to comment on the Bureau of Reclamation (Reclamation) "Supplemental Environmental Impact Statement (SEIS) and a modified Record of Decision (ROD) for the 2007 Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead" (2007 Interim Guidelines) announced in the Federal Register Notice of November 17, 2022. We believe this is an important and timely process that must address the intersections between dam operations, water supply, riverine resources and processes and challenges involving stakeholders on the Colorado River. Given the potential impacts to resources and recreation on park units, we look forward to working with you collaboratively during this expedited process.

Request for Cooperating Agency Status and for Consulting Party Status

The NPS requests cooperating agency status for the forthcoming National Environmental Policy Act (NEPA) review pursuant to 40 CFR 1501.8 due to our special expertise and knowledge on the resources within the national park units. The proposed alternatives to be considered in this planning process may affect resources the NPS is legislatively mandated to protect, including threatened or endangered fish and wildlife, water quality, air quality, vegetation, wildlife habitat, geological features, geomorphic processes, and cultural, paleontological, and ethnographic resources, among others. Recreational opportunities in these park units draw over 27 million

visitors annually to the seven basin states, creating over \$2.3 billion dollars of revenue. For these reasons and given NPS special expertise and knowledge on the resources within the national park units, we request cooperating agency status for the forthcoming National Environmental Policy Act (NEPA) review pursuant to 40 CFR 1501.8. The NPS also requests consulting party status under Section 106 of the NHPA. We offer expertise in management and protection of cultural resources at multiple park units potentially impacted by the proposed alternatives in the SEIS.

General Comments and Potential Impacts to NPS Resources

As mandated by the Organic Act of 1916, the NPS manages and protects resources and manages recreation in nine park units that collectively contain one thousand miles of river and shoreline that may be impacted by this project's alternatives. These park units are Dinosaur National Monument (NM), Curecanti National Recreation Area (NRA), Black Canyon of the Gunnison National Park (NP), Canyonlands NP, Arches NP, Glen Canyon NRA, Rainbow Bridge NM, Grand Canyon NP and Lake Mead NRA. The 1992 Grand Canyon Protection Act (GCPA) also mandates that the operations of the Glen Canyon Dam (GCD) protect, mitigate adverse effects to, and improve the natural and cultural resources and recreation below the GCD in Grand Canyon NP and Glen Canyon NRA. We provide these comments under the scenario that the SEIS may be in place at least two years and possibly until a post-2026 ROD is completed.

We suggest the following issues require analysis to determine potential impacts and ways to avoid, minimize or mitigate associated impacts to NPS resources and values. We are prepared to work with you to ensure that these issues are considered appropriately in this SEIS:

- Diminished Water Quality throughout the Colorado River ecosystem (temperature increases, decreased dissolved oxygen and potential for increased algal blooms in Powell, Mead, and Blue Mesa reservoirs, potential periodic inability to meet recreational water quality standards and potential impacts of impaired water quality to wildlife),
- Diminished Air Quality (shoreline dust from reduced reservoirs may present human health and environmental concerns and may require monitoring, modeling, and mitigation);
- Loss of River Dynamics and Natural Functions (such as further reduced peak flows and altered base flows will drive further degradation of river channels, including undesirable changes in sediment movement, vegetation density, and fish and wildlife habitat);
- Impacts to Endangered Species and native aquatic ecosystems (particularly federally listed fish below GCD and Hoover that may be influenced by increased dam passthrough by non-native fish who may reproduce in increased river temperatures);
- Exposure of Cultural and Paleontological Resources as large acreages of irreplaceable resources may be exposed and eroded at Glen Canyon, Grand Canyon and Lake Mead and may require survey and mitigation measures to protect them;
- Impact to Traditional Cultural Properties and culturally significant resources valued by our tribal partners who view the area as a living river with sacred values;
- Decreased Recreational Access and Decreased Regional Economic Support (alternatives in this process have potential for greatly reduced regional economic values and major impacts to gateway communities, adjacent tribes, and park concessioners at reservoir park units and potential for lower flows that could impact river rafting recreation in the Grand Canyon);

- Geohazards related to calving of exposed cliff faces, rock falls, low water exposure of rock features, and locations with quicksand in Glen Canyon NRA and Lake Mead NRA; and
- Other impacts that include changes to grazing, water wells, and visitor use patterns.

Water Quality

The NPS suggests that lower reservoir levels, particularly levels below power pool at Lake Mead or Lake Powell, may present increased risks of water borne diseases (such as *Naegleria fowleri*), harmful algal blooms (HABs), low dissolved oxygen, and risks to human health through reduced recreational water quality. The quality of available modeling differs between Lake Mead and Lake Powell. Lake Mead has more extensive water quality modeling resources due to the capabilities of the Southern Nevada Water Authority. Nonetheless, modeling at Lake Mead has focused on drinking water quality and additional modeling would be needed to incorporate recreational water quality into existing models. The NPS encourages Reclamation to evaluate data and modeling capabilities at Glen Canyon NRA, Lake Mead, and Curecanti NRA and determine what scenarios can be modeled for this SEIS or, with additional development, for the Post 2026 process. The NPS is concerned about the possibility that lower reservoir elevations at Lake Powell may also influence water quality concerns at Lake Mead NRA – they may be tied together and not separate issues. Water quality impacts from lower reservoir levels may present risks to human health and to downstream water supply that we recommend analyzing. Water quality is also impacted in the Colorado River through the Grand Canyon with much warmer river waters that may have major impacts to the fish communities and may also require evaluation regarding human health impacts for river recreation.

Air Quality

Significantly lower reservoir levels at Glen Canyon NRA, Curecanti NRA, or Lake Mead NRA would likely increase dust mobilization from the greatly increased surface area of unvegetated shoreline. In windy conditions, these large areas would have the potential to affect local air quality and lead to negative human health impacts due to particulates and/or sediment composition. Sampling, monitoring, and modeling is needed to assess the extent of these impacts. Dust abatement mitigation actions may be needed to address these concerns, especially for nearby park units, such as Grand Canyon NP, that are designated as Class I areas under the Clean Air Act.

River Dynamics and Natural Functions

The NPS units that would be affected by SEIS actions have over 1000 miles of river corridor and shorelines influenced by dam releases. The alternatives in this process could determine whether Lake Powell is in an operating range that can allow for High Flow Experiments (HFEs) to be performed in the Grand Canyon. HFEs represent the only tool to rebuild sandbars and beaches in the canyon, critical as part of the dynamics that affect vegetation scour and the redistribution of sediment. These dynamics, in turn, affect the protection of cultural resources (e.g., 362 archaeological sites along the river corridor in Grand Canyon NP) and the recreational access for river rafters through the canyon. The alternatives in this SEIS would dictate whether HFEs are possible and may determine how well agencies can protect these resources and comply with the GCPA, the National Historic Preservation Act (NHPA) and the NPS Organic Act. The Hualapai

Tribe has expressed concern to the NPS and through the Glen Canyon Dam Adaptive Management Program that the lack of HFEs is promoting the buildup of sand in the river in western Grand Canyon. This condition is affecting the tribe's Grand Canyon West operation, creating a safety threat to river visitors and thus harming the tribe's commercial recreational interests. The NPS has similar concerns for Grand Canyon NP. We recommend:

- the SEIS consider the frequency of HFEs allowed under the standard Long Term Experimental and Management Plan (LTEMP) protocols for these lower water conditions, and it should also consider adapted timing and duration of these HFEs for conditions that were not contemplated in the LTEMP; and
- the SEIS consider the frequency, duration, and magnitude (minimum discharge) of periods of low river flow that might be implemented.

Low river flows do not offer an alternative to rebuild sandbars but are important for resupplying sand via transport by wind from the river channel to higher elevation dune fields throughout Grand Canyon where sand buries and protects archaeological sites from erosion and visitor impacts.

If SEIS alternatives influence Drought Response Operation Agreement (DROA) actions, then the NPS recommends that these actions be analyzed on a multi-year basis. This would include analyzing the impact of flows out of Flaming Gorge Reservoir on the Green River above Dinosaur NM, flows out of Blue Mesa Reservoir in Curecanti NRA and above Black Canyon of the Gunnison NP, and flows on the San Juan out of Navajo Reservoir. The frequency, timing, and magnitude of DROA flows can greatly impact the river dynamics and natural processes of the river through these park units. These dynamics impact the very structure of the river including the channel width and complexity, as well as the vegetation along the river and the fish habitat and conditions in the river. The alternatives in this process could impact how frequently DROA flows are used and thereby have positive or negative effects on the entire river corridors in Dinosaur NM, Canyonlands NP, and Black Canyon of the Gunnison NP, and may require modeling to determine the extent of those effects. Alternatives in this process could also dictate whether Flaming Gorge Reservoir is in an operating range to support ongoing environmental flows along the Green River that support threatened and endangered fish (e.g., Larval Trigger Study Plan to promote razorback sucker, base flows to promote Colorado pikeminnow) and inhibit non-native fish (e.g., flow spikes to inhibit smallmouth bass).

Endangered Species and Native Aquatic Ecosystems

Rapidly reduced reservoir levels at Lake Powell are already impacting both the numbers of invasive warmwater fish species passing through the GCD and the breeding conditions for these fish below the dam. Dramatically increased release temperatures (5-10 degrees Celsius warmer than in the past 50 years) are creating suitable habitats for reproduction of smallmouth bass, green sunfish and other invasives that are voracious predators of native fish that could have large adverse effects to the native fish communities in the Grand Canyon. These fish present a clear risk to the status of the federally listed humpback chub. The elevation level chosen as the target for a minimum elevation at Lake Powell may impact both passthrough and water temperature. In consequence, this may impact the amount of bypass use or other options to be considered in the separate planning and EA process related to smallmouth bass response in which Reclamation is currently engaged. The NPS has identified a need for specific modeling of the effects of

alternatives on smallmouth bass and other invasive fish and the corresponding risk to humpback chub populations (including minimums and maximums) and habitat modeling over time. This modeling should consider humpback chub population minimums and maximums, potential variations in water quality and quantity, and other habitat effects. If carried out, this modeling would allow for comparison between alternatives, possibly showing very different trajectories for this federally threatened species between the alternatives.

Federally listed fish in Lake Powell, the San Juan arm of Lake Powell, Lake Mead and below the Hoover Dam may also be impacted by SEIS alternatives and should be analyzed. The NPS suggests that altered temperature or flow regimes from dramatic drops in reservoir levels may lead to changes in water quality, dissolved oxygen levels and invasive mussel populations. This may also impact listed species. Analysis and modeling would allow Reclamation to evaluate the full extent of these impacts.

Cultural and Paleontological Resources

The NPS recommends SEIS alternatives consider the affected cultural and paleontological environments and consider efforts that would be required to survey newly exposed lands, identify resources and plan for their treatment. SEIS alternatives could reduce reservoir levels at Glen Canyon NRA, Lake Mead NRA and Curecanti NRA (if DROA actions are increased by this SEIS). This would pertain to the no action alternative or to action alternatives that do not quickly stabilize supply and demand. Reduced reservoir levels would increase the acreage of unvegetated shorelines and the exposure of cultural and paleontological resources. These resources may require survey and mitigation to protect, especially given that visitor use patterns and activities change in response to new land exposure. At Lake Powell, this exposure is revealing areas that were surveyed in the 1950s. The 1950s survey standards did not account for several types of archeological sites that are now recognized. Lake Powell also has very high-quality paleontological resources of worldwide significance requiring protection under the NPS Organic Act. Lake Mead NRA has multiple areas being exposed that may have cultural and historic significance to indigenous communities. Within the lakebed are a wide range of cultural resources that document the early history of the area and include more modern objects such as a WWII-era B-29 bomber that would attract extensive public attention. As artifacts are exposed from dropping lake levels, they will be increasingly vulnerable to looting, as well as damage from environmental conditions.

Traditional Cultural Properties and Values of Importance to Tribes

The NPS has a long history of consultation with our tribal partners associated with the nine potentially affected national park units. Our long consultation history with our tribal partners has documented many areas that are of special sacred importance. Some areas are documented Traditional Cultural Properties, while other locations are of traditional and spiritual importance. Many indigenous people believe the Colorado River is a living entity and consider preservation of the river and its dynamics of spiritual importance. They view the river as the lifeblood of the Grand Canyon and the backbone of life. When developing the SEIS alternatives, NPS recommends that Reclamation work with tribes in formal government-to-government consultation.

Recreation and Regional Economy

Glen Canyon NRA, Grand Canyon NP and Lake Mead NRA have a combined annual visitation of over 15 million visitors and an annual regional economic impact of over \$1.8 billion. A large portion of this regional economic impact is related to large boat recreation on Lake Mead and Lake Powell. The alternatives in this SEIS will impact the viability of that recreation type on these park units. Given the drop in water levels over the last two years, NPS has lost recreational access at boat ramps (from 11 ramps to 2 ramps at Glen Canyon and from 8 ramps to 1 ramp at Lake Mead) with several facilities at a sizeable distance from the water's edge. To date, the NPS' response to dropping lake levels has involved substantial amounts of high-cost construction, planning and adjustments of facilities and utilities. The No Action alternative and action alternatives that fail to quickly stabilize supply and demand will greatly accelerate these costs while reducing the economic benefits to regional gateway communities. NPS recommends the SEIS evaluate these issues in detail.

The NPS also recommends the SEIS evaluate the impacts alternatives may have on NPS water operations. In addition to regional economic and NPS infrastructure impacts, the shoreline at both Lake Mead and Lake Powell NRAs recedes several feet horizontally for each vertical foot drop in lake level. Impacts to NPS recreational infrastructure and utilities are multi-faceted. The reduction in lake surface area has resulted in wakeless areas and changes to traffic patterns and travel time. Large boat launching and travel through narrower channels has become more time consuming and complicated. Smaller watercraft traffic has increased in some areas.

NPS recommends the recreational and economic impacts of these potential changes be evaluated in the SEIS. River recreation in the Grand Canyon would also be impacted by SEIS alternatives. Reduced flows in the Grand Canyon would negatively affect both commercial and non-commercial recreational river rafting. Decreased flows, below 5000 cfs, have been shown to diminish safety and overall visitor experience. These low flows would limit motorized use and limit total river rafting visitor capacity in the Grand Canyon.

Finally, recreational impacts at Curecanti NRA's Blue Mesa Reservoir could be incurred should DROA releases be integral to any of the SEIS alternatives. These impacts should be evaluated if DROA releases are indeed contemplated in the SEIS.

This SEIS will consider enacting greater changes at one or both big reservoirs and to flows in the Grand Canyon than have been contemplated or experienced in the past 50 years. It could also impact recreation and resource issues at Curecanti NRA's Blue Mesa Reservoir through DROA releases. If reservoir levels were set with a buffer above power pool at both Lake Powell and Lake Mead reservoirs and protected as an annual minimum through triggered releases that balance inflow and outflow of the reservoirs, then recreational access and regional economic value would be predictable and sustainable at both lake units and the Grand Canyon. NPS might still need substantial investment to adjust, move and update facilities to a lower level, but a buffered level above power pool is much more tenable than allowing these reservoirs to fall to dead pool. The extent of all these recreational impacts on both the NPS budgetary situation and the regional economy would require analysis should this approach be considered in the SEIS.

Geohazards

As water levels in Glen Canyon NRA and Lake Mead NRA recede, serious safety hazards are developing from calving of exposed cliff faces, rock falls, low water exposure of rock features, and locations with quicksand. Rock falls and cliff calving are already documented in online videos publicly available on the internet. Navigation buoys and docking structures must be repeatedly relocated to minimize hazards to the visiting public. Boat ramps go offline or are extended to avoid geohazards and retain at least some water access. Quicksand is a safety hazard causing rescues and limitations in public access. Geohazard impacts should thus be considered under the alternatives in the SEIS.

Geographic Scope of the Process

NPS recommends that Reclamation look beyond the operation of Hoover Dam and GCD for the geographic scope of the SEIS because actions under the DROA appear to be affecting resources across the basin and we expect these or similar actions to be considered under this planning process. NPS recommends inclusion of analysis of the Flaming Gorge Dam (FGD) to fully consider multiyear actions. Including FGD in this process may reveal opportunities to reduce basin-wide effects on resources, recreation, and water delivery that would otherwise be missed. On the other hand, we do not recommend the Aspinall Unit operations be considered in the SEIS; the current Aspinall ROD should remain in place unless it is anticipated DROA water will be used from this reservoir in conjunction with this SEIS. If it will, then this should be included in the analysis in this document to consider the impacts to the reservoir in Curecanti NRA and the river through the Black Canyon of the Gunnison NP.

Alternatives Development

NPS requests BOR work closely on alternative development with all DOI bureaus to optimize the meeting of all bureau mandates. The timing of this may require weekly meetings starting January 1, 2023.

In addition, NPS recommends the following ideas be considered in the alternative development process:

- Consider setting a goal of protecting Lake Powell to a minimum annual elevation of 3540' (or other if recommended by GCMRC researchers) to minimize non-native fish passthrough at GCD and reduce the warming of the river below the dam.
 - If this is not possible in the short-term then a protection level of at least 3525' or 3530' would be much better than the zone between 3490' - 3525' in which river temperature and fish passthrough issues are greatly exacerbated. Operating below 3525' would greatly increase risks for impacting downstream threatened humpback chub based on the increased risk of establishment of smallmouth bass and other warm water non-native fish. Because GCD was never intended to operate below power pool, any potential alternatives for future operations below 3525' should be analyzed for impacts to the threatened humpback chub.
 - Protecting a level at Lake Powell would necessitate setting the annual release from GCD to be equal to the annual inflow minus evaporation loss. If DROA may be used as part of the equation, then this should be explicitly included, and the effects of those actions should be analyzed.

- This would minimize the effects to recreational access and regional economy, to water quality risks, to air quality/dust issues, to cultural and paleontological resource exposure on shorelines.
 - This would ensure power production is retained and may minimize the need for bypass use to cool the river water below the dam.
- Consider setting a goal of protecting Lake Mead at a minimum annual elevation of 1025' to minimize effects at this reservoir.
 - If it is not possible to maintain 1025' in the short-term, then maintaining at least 1000' would have lower risks than allowing the level to fall below power pool or down to dead pool.
 - Maintaining a level at Lake Mead would necessitate setting the annual release from Hoover Dam to be equal to the annual inflow (GCD release + tributaries) minus evaporation loss and Nevada withdrawals and would stabilize supply and demand.
 - Falling below these levels would have several negative effects to recreational access and regional economy, to water quality risks, to air quality/dust issues, to cultural resource exposure on shorelines. Maintaining 1025' or 1000' would have significantly less impacts than going all the way down to dead pool and would also ensure power production is retained. Hoover Dam was never intended to operate below power pool.
- If the federal alternative will not be designed to balance supply and demand and will not protect elevations above power pool at both reservoirs, then NPS will want to work with Reclamation on the analysis of impacts to determine whether protecting the elevation at Lake Powell or protecting the elevation at Lake Mead would better meet the federal mandates that DOI bureaus are required to apply to this federal action.
- NPS urges Reclamation to consider in the SEIS or in the smallmouth bass EA (whichever is more appropriate) an option for adjusting the GCD High Flow Experiment sediment accounting windows and operational timing for HFEs to climate change and lower water levels. This would allow for either smallmouth bass flow spikes or HFEs to be considered in May-June when the reservoir level is at its highest, making use of sediment accrued throughout the year, so that agencies may continue to comply with the GCPA. In low water conditions this would allow for not considering HFEs in the Oct-Nov and Mar-Apr time period when there may not be sufficient water in this operating range. This would result in DOI staff efficiency and better protection of cultural resources that would be exposed without this sediment redeposition and protection of recreational camping in the canyon. We are providing a fully detailed version of this in our comments on the Glen Canyon Dam Smallmouth Bass Flow Options EA.
- We recommend the following scenario be disclosed in the SEIS. Depending on the alternative selected, the SEIS may have a bearing on the EA that would consider bypass flows out of GCD that could disadvantage non-native fish such as smallmouth bass and green sunfish and/or lower river temperatures. If a higher protection elevation were chosen for Powell in the SEIS, it could negate or reduce the need for bypass flows. If a lower protection elevation were chosen in the SEIS, it is possible that it could increase the need for those flows.
- The NPS recommends that Reclamation conduct further analysis of the DROA operations on a multi-year basis if the SEIS assesses protection of elevation levels at Lake Powell,

and if this impacts frequency or amount of the DROA operations. We recommend that there be analysis of the timing and magnitude of that contribution and the multi-year impacts to resources from that movement if operations of Flaming Gorge Dam (FGD) are included in the SEIS. The NPS recommends that Reclamation consider using any DROA operations for maximum environmental benefits by including larger spring peak flows; and to consider hydrological patterns that conform to the Upper Basin Recovery Program Green River Evaluation and Analysis Team (GREAT) report recommendations.

Thank you for the opportunity to comment on this important SEIS. We understand the overwhelming nature of this expedited and expansive planning process. We look forward to working closely with you in late December 2022 and January 2023 on the modeling that is feasible on this expedited timeline. We want to ensure full consideration of the impacts within the national park units in this SEIS and are prepared to collaborate with you in order to achieve this goal. Please contact Rob Billerbeck, NPS Colorado River Program Coordinator, at 303-987-6789 or rob_p_billerbeck@nps.gov if you have any questions on these comments or wish to discuss them further.