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United States Department of the Interior

NATIONAL PARK SERVICE
INTERMOUNTAIN REGION
12795 West Alameda Parkway
P.O. Box 25287
Denver, Colorado 80225-0287

IMRO-RSS-COR (1241)

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Memorandum

To: Kathleen Callister, LTEMP SEIS Project Manager
Wayne Pullan, Regional Director, Upper Colorado Basin, Reclamation

From: Ed Keable, Superintendent, Grand Canyon NP EDWARD KEABLE Digitally signed by EDWARD KEABLE Date: 2023.11.02 15:12:02 -07'00'
Michelle Kerns, Superintendent, Glen Canyon NRA MICHELLE KERNS Digitally signed by MICHELLE KERNS Date: 2023.11.02 08:15:04 -07'00'

Subject: NPS Comments in response to the "Notice of Intent To Prepare a Supplemental Environmental Impact Statement for the December 2016 Record of Decision Entitled Glen Canyon Dam Long-Term Experimental and Management Plan" prepared by the Bureau of Reclamation

The National Park Service (NPS) appreciates the opportunity to provide input on the "Notice of Intent To Prepare a Supplemental Environmental Impact Statement for the December 2016 Record of Decision Entitled Glen Canyon Dam Long-Term Experimental and Management Plan (LTEMP)" (hereafter SEIS) prepared by the Bureau of Reclamation's (Reclamation) and released on October 4, 2023. The following statements represent the views of the National Park Service. Our comments below are consistent with our comments on the "Glen Canyon Dam Smallmouth Bass Flow Options Environmental Assessment" upon which this SEIS will be built. We continue to work closely with Reclamation on rapid response, and with Grand Canyon Research and Monitoring Center (GCMRC) as science advisors, and with US Fish and Wildlife Service (USFWS) as the regulatory agency for endangered species.

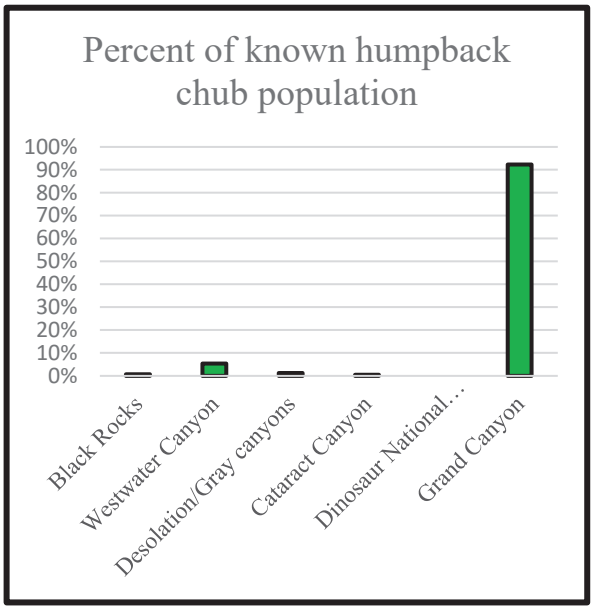
Overall issues:

- Timeline: Completing this process by late spring 2024 is imperative for this issue. Smallmouth bass (SMB) has shown reproductive behavior the last two years as soon as water temperatures below the dam have reached 16 degrees Celsius. For the tools in this plan to be effective at preventing establishment of SMB, then June of 2024 is when these tools will need to be available to address spawning as that is when river temperature may once again reach the levels that will drive more spawning. Delays to this process may result in the loss of the opportunity to prevent establishment of SMB. Such a delay could have irreversible detrimental impacts on the native fish community in the Grand Canyon and negative impacts on the populations of federally threatened humpback chub and the federally endangered razorback sucker in Grand Canyon National Park.

- Cost considerations: The costs of lost revenue to hydropower will be a consideration in this process, but should be weighed with these perspectives:
    - Hydropower is an incident to the other purposes of the dam. GCD is authorized for 'for the purposes, among others, of regulating the flow of the Colorado River, storing water for beneficial consumptive use, making it possible for the States of the Upper Basin to utilize, consistently with the provisions of the Colorado River Compact, the apportionments made to and among them in the Colorado River Compact and the Upper Colorado River Basin Compact, respectively, providing for the reclamation of arid and semiarid land, for the control of floods, and for the generation of hydroelectric power, as an incident of the foregoing purposes,' 43 U.S.C. § 620 (1956).
    - In the Grand Canyon Protection Act (GCPA) of 1992, Congress mandated that GCD operate "to protect, mitigate adverse impacts to, and improve the values for which Grand Canyon National Park and Glen Canyon National Recreation Area were established' and in a way "fully consistent with and subject to" Colorado River authorities "that govern allocation, appropriation, development, and exportation of the waters of the Colorado River basin," (Public Law 102-575, section 1802).
    - Western Area Power Administration was obligated in the past to contribute $20 million per year to species recovery but has retained that amount in the Upper Colorado Basin Fund for 4 out of the last 5 years as federal appropriation dollars are now being used instead. The cost of bypass for a few years may be less than the amount of funding that would have funded for endangered fish recovery if not for this recent change.
    - Losses to hydropower revenue from bypass in a given year will vary greatly depending on reservoir level and inflow to Lake Powell and the resulting outflow temperatures from GCD. Some years may require very little bypass to achieve the temperatures to inhibit SMB breeding. Revenue losses must be evaluated for the entire range of hydrology scenarios to provide accurate cost assessment, and not be limited to a worst-case single hydrology run as was done in the EA.
    - Hundreds of millions of dollars have been invested toward endangered fish recovery in the Colorado River basin. In the Upper Basin from 1989 through 2021, the recovery programs spent $209 million in capital, and were federally funded starting at $8 million per year for annual base funding. “No action” on this issue of invasion of SMB into the Grand Canyon may risk losing the progress made by these other programs. These efforts also serve as a harbinger of possible fish-recovery costs in both basins if we fail to prevent SMB establishment below GCD.
    - Many past government efforts on invasive species have shown there are large economic benefits by responding early in the invasion curve rather than trying to suppress later in the invasion curve (Blaalid et al. 2021).
    - SMB were rated as the highest threat to humpback chub in the 2018 species status assessment (USFWS 2018) and over 92% of adults in the world (Badame 2008; Francis et al. 2016; USFWS 2018; Hines et al. 2020; Caldwell 2021; Van Haverbeke et al. 2022, 2023) are located below the GCD and have not had to contend with SMB until now (see figure 1). There is evidence from the Upper Basin that the presence of invasive fish, particularly like SMB, have been the largest determining factor in declines in native and federally listed fish in the last 20 years (Johnson *et al.* 2008, Martinez et al. 2014). A rapid decline in humpback chub from non-native predation could have operational cost

implications throughout the entire Colorado River basin for state and federal government agencies. Revenue losses for hydropower should be weighed against potential costs from losses of operational flexibility and future water development throughout the system if humpback chub status changes.

Figure 1. Current adult population abundance estimates (N) with upper and lower confidence intervals for humpback chub (*Gila cypha*) at six locations throughout its range. Estimates taken from most current and available reports (Badame 2008; Francis et al. 2016; USFWS 2018; Hines et al. 2020; Caldwell 2021; Van Haverbeke et al. 2022, 2023).



Resources of greatest concern:

For the NPS, these issues of greatest concern include, but are not limited to:

- Endangered Fish - The federally threatened humpback chub and the federally endangered razorback sucker are present in the Grand Canyon below the GCD. As shown above, over 92% of the adult humpback chub exist in this one stretch of river, This stretch of the Colorado has had the lowest population of invasive warmwater predators until now. Establishment of SMB and a suite of the warmwater predators is expected to have major negative impacts to these populations and the USFWS led multiagency SMB task force recommended a combination of bypass flows and flow spikes as the most effective approach (AMWG notes, May, 2022). Increasing numbers of SMB in the Glen Canyon reach below the dam in 2022 and 2023have led to mechanical and chemical rapid response efforts to try to reduce numbers. In 2023, the first captures of SMB in recent years in Grand Canyon required emergency rapid response. Timing is critical to prevent expansion of the SMB population next summer to prevent them from coming into contact with humpback chub aggregation areas in Grand Canyon.
- Native fish species of the Grand Canyon – There were originally 8 native fish species endemic to the Colorado River that were present in the Grand Canyon but three have been extirpated (Colorado pikeminnow, roundtail chub and bonytail). The remaining five species include the two federally listed (humpback chub and razorback sucker), one Arizona species of concern (bluehead sucker), and two species with currently large and healthy populations (flannelmouth suckerand speckled dace;NPS 2013). These populations of fishes are resources that should be protected under both the 1992 GCPA and the NPS Organic Act that requires management to avoid impairment.

These fish populations and the aquatic community are at risk if SMB and other warmwater invasive species establish in the Grand Canyon due to dam operations that allow for increased entrainment and for warmer release temperatures creating suitable temperatures favoring establishment of the invasives. The proposed alternatives involving bypass flows and flow spikes are expected to be very effective at preventing warmwater non-natives from establishing and impacting these native species (based on the SMB Task Force work and the GCMRC analysis for the EA).

- Sediment resources – Sandbars form a fundamental element of the river landscape and are important for vegetation, riparian habitat for fish and wildlife, cultural resources, and recreation (Wright, Schmidt, et al. 2008; Reclamation 1995; Reclamation 2016). For example, they form the substrate for limited riparian vegetation in the arid environment. Low-elevation sandbars create zones of low velocity aquatic habitat (i.e., backwaters) that may be utilized by juvenile native fish. These low elevation sandbars are also a source of sand for wind transport that may help protect archaeological resources. In addition, beaches provide recreational value for visitors (e.g., camping areas for river and backcountry users) (Reclamation 2016).
- Cultural resources – in the Grand Canyon there are over 300 documented archeological sites in the river corridor and there are very likely many more not documented that are currently covered by sediment. The 1992 GCPA mandates dam operations in a manner to protect or mitigate these resources. This LTEMP SEIS will influence the protection of these resources as it considers adjusting the High Flow Experiment (HFE) protocol to allow for adjustments to timing of HFEs that are more compatible with the lower reservoir operating range we have experienced in recent years. HFEs are the only dam operation for rebuilding sandbars to provide the source material for aeolian transport that can keep many of these cultural sites protected.
- Recreation and regional economic concerns
    - Camping beaches in Grand Canyon – Adjustments to the HFE protocol will also help protect recreational camping sites and capacity for more than 24,000 visitors who raft the Colorado River through the Grand Canyon every year. The annual visitation to the Grand Canyon was over 4 million visitors in recent years (4,532,677 in 2021) and produced economic output for the region of almost a billion dollars ($0.94 billion).
    - Recreational Rainbow Trout Fishery in Glen Canyon – The operating range of Lake Powell in recent years is creating increased river temperatures, periodic decreases in dissolved oxygen and increases in warm water non-natives that may have negative impacts to the rainbow trout in and the recreational fishery in Glen Canyon. No action in this LTEMP SEIS would likely continue these negative impacts (Benjamin 2012). The proposed alternative should be evaluated to see if it may have benefits to protecting this recreational fishery which provides opportunity to over 15,000 visitors in busy months and contributes to the regional economic benefits.

Alternatives/Mitigation Measures:

NPS would offer these comments on alternatives:

- Evaluating an alternative with summer bypass with flow spikes - The action alternative in this EA, including the use of bypass and flow spikes was conceptually analyzed and recommended by the SMB task force led by the USFWS last year (AMWG notes, May 2022) the tool most likely to be effective at preventing the establishment of SMB below the dam.

- The Notice of Intent (NOI) states that an alternative without bypass will be evaluated – based on the evaluation of the SMB task force and the subsequent analysis performed in the development of the EA, this option is unlikely to meet the need for this SEIS when considered as a stand-alone alternative and Reclamation should consider incorporating this as a sub-option in the proposed alternative that includes bypass. Using only flow spikes and not bypass to lower temperatures, would be significantly less effective under most of the operating range, but there could be parts of the operating ranges or temperature ranges where this option would be available and have some benefits when bypass is not available or would be ineffective. These will be limited circumstances (such as very close to power pool elevation). NPS requests reclamation evaluate the effectiveness of the flow tools at different elevation ranges and inflow/outflow conditions, and to identify the tools that are most effective in those ranges and have the proposed alternative allow for the use of those tools when they are most effective.
- Nets/barriers below the dam – The NOI doesn't mention the consideration of including any nets or barrier options to prevent additional entrainment of warmwater non-natives. We understand Reclamation is pursuing this separately on a longer timeline. However, we also understand there are some encouraging options involving nets below the dam in the restricted area that may present less risks and complications to dam infrastructure that could be implemented on a faster timeline. We would urge consideration of those options as a common to all element for the alternatives in this process (to be used in combination the flow options). If they could be installed and used sooner, it would make a difference while we are in the early stages of the invasion curve for SMB.
- HFE amendments – The Flow Ad Hoc Group (FLAHG) report on HFE Amendments was approved at the August 2023 AMWG meeting and should be incorporated into the alternatives as written with an expanded one year sediment accounting and implementation window to allow for the flexibility to consider HFEs in the May-June time period when the reservoir is at its highest during the year and when levels are the most certain. This is also the period in which peak flows were historically and would likely be the most beneficial to the organisms throughout the system. Because these native species evolved with this timing then this timing is likely to have the most beneficial effects and the least unintended negative impacts.
- Analysis of how to combine experiments – the potential for HFEs, SMB flow spikes and bypass flows, macroinvertebrate flows and Trout Management Flows (TMFs) to all occur in the late spring/early summer requires resolution in this document. NPS would urge Reclamation to request GCMRC to provide recommendations how to address this issue in a way that would be both simple and clear while providing the best outcomes for the resources addressed under the 1992 GCPA.

Sources of Information:

NPS would suggest these additional sources information for the analysis.

- Hydropower revenue loss estimates – timeline for this process is critical to have tools available by June of 2024 when conditions in the river will again be suitable for SMB breeding. It is important to consider a range of reservoir conditions in the cost estimates for hydropower revenue, but if full analysis of these costs using GTMax may take too much time to meet the timeline, we would encourage Reclamation to consider using cost estimates produced by GCMRC personnel. Our understanding is that in the past two years GCMRC capabilities to make reasonable estimates has improved significantly.

Thank you for the opportunity to comment on this important and expedited process.
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 further.

Ed Keable, Superintendent, Grand Canyon NP
Michelle Kerns, Superintendent, Glen Canyon NRA
National Park Service Interior Regions 6, 7, & 8

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