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Memorandum

To: Wayne Pullan, Regional Director, Upper Colorado Basin, Reclamation  
Sarah Bucklin, Project Manager, Bureau of Reclamation

From: Edward Keable, Superintendent, Grand Canyon National Park (NP) Edward T. Keable  
Michelle Kerns, Superintendent, Glen Canyon National Recreation Area (NRA) MICHELLE KERNS

Subject: NPS Comments in response to the “Glen Canyon Dam Smallmouth Bass Flow Options Environmental Assessment” to be prepared by the Bureau of Reclamation

Digitally signed by Edward T. Keable  
Date: 2022.12.14 16:16:05 -0700

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Date: 2022.12.14 22:04:28 -0700

The National Park Service (NPS) appreciates the opportunity to provide input on the Bureau of Reclamation's (Reclamation) "Glen Canyon Dam/Smallmouth Bass (SMB) Flow Options Environmental Assessment (EA)" announced in the webinar facilitated by Sarah Bucklin on December 1, 2022. The following statements represent the views of the NPS.

We believe this is an important and urgent process that must address the impacts of dam operations on the native fish communities and the federally listed fish below the Glen Canyon Dam (GCD). There is a clear and present danger to the federally threatened humpback chub and other native fish in Glen and Grand Canyon downstream of the dam from the passthrough of warmwater non-native fish and the warmer river temperatures that occur in the lower operating range of Lake Powell (falling below the 3540’ level). If smallmouth bass or other highly predatory non-native fish breed and establish below the dam then there is a strong possibility of their establishment in both the mainstem and tributaries and the likelihood of negative impacts to many of these fish populations, including the federally listed fish populations, over the coming years.

**Cooperation and Coordination**

The alternatives to be considered in this planning process may affect resources the NPS is legislatively mandated to protect, including threatened and endangered fish and wildlife, water quality, vegetation, wildlife habitat, geological features, geomorphic processes, cultural, paleontological, and ethnographic resources, among others.

We note the impacts of climate change generally, and the smallmouth bass invasion into the Grand Canyon specifically, have extremely important implications for Indigenous people who have called the Grand Canyon home since time immemorial. In addition to the significance to Indigenous people, these issues are also important for Department of the Interior (DOI) agencies, as we have a trust responsibility to these Tribes, and we must consider this responsibility in our planning processes.

We understand that Reclamation will not have cooperating agencies involved in this process given the urgency to stay ahead of smallmouth bass breeding and the expedited process. We do, however, request a close working relationship with Reclamation on this initiative. NPS is one of the DOI bureaus with responsibility for these resources and, as stated in the 2016 Long Term Experimental and Management Plan (LTEMP) Record of Decision (ROD), has a role in the Adaptive Management Program as one of the bureaus that contributes to the decision making for the Secretary. Close NPS involvement in the form of weekly meetings and pre-review of information to be distributed to stakeholders would ensure that all DOI mandates are considered in these materials.

### **Potential Impacts to NPS Resources**

As mandated by the Organic Act of 1916 (“NPS Organic Act”), the NPS manages and protects resources including recreation in Glen Canyon National Recreation Area (NRA) and Grand Canyon National Park (NP). Approximately 292 miles of river corridor in these park units may be impacted by this project’s alternatives. The 1992 Grand Canyon Protection Act (GCPA) also mandates that the GCD be operated in a manner to 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.

### Impacts to native and federally listed fish

The most serious resource issue for the GCD related to this process is in the past year, we have been documenting an increase of invasive warmwater non-native fish passing through GCD. The Post 2026 alternatives will affect this situation with important differences between alternatives. Currently, dramatically increasing release temperatures have created suitable habitats for reproduction of these warmwater non-natives in the Colorado River below GCD. As of July 2022, there have been monitoring observations supporting the occurrence of breeding smallmouth bass below the GCD. Additional numbers of smallmouth bass have been documented and removed in the past two months during mechanical and chemical removal efforts in the Glen Canyon reach.

Resource protection and hydropower have often been competing concerns in decision processes in the past. As important as hydropower is to the region, we cannot afford to prioritize short term hydropower production concerns over the protection of federally listed fish in this alternatives analysis. We are now in a time of major changes in river temperatures and flow regimes when it is vital to prioritize federally listed fish in alternatives analysis. Failure to prioritize fish now could lead to legal challenges with water management in the Colorado River, as well as probable risk to fish populations and our agency’s legal obligations to these populations under the

Endangered Species Act (ESA), the Grand Canyon Protection Act (GCPA), and the 2007 Interim Guidelines ROD and the 2016 LTEMP ROD.

Smallmouth bass are a particularly voracious predator species that has impacted native and federally listed fish in the upper basin. If smallmouth bass and other high-risk, warmwater, non-native predators establish below the dam, this would significantly impact native fish communities, based on experience in the upper basin, presenting great risk to the status of the federally listed humpback chub in the near future. This is a high priority for protection under the Grand Canyon Protection Act, the Endangered Species Act, and the 2007 Interim Guidelines ROD and the 2016 LTEMP ROD. Millions of state and federal dollars have been invested in the protection of this species throughout the Colorado River basin over the past decades. We believe the investment of a relatively small amount of state and federal resources now would avoid having to spend additional millions of dollars in the future, by engaging in prudent planning that seeks to best minimize smallmouth bass invasion.

The NPS has identified a high priority need to specifically model the risk to humpback chub populations (including minimums and maximums), by habitat modeling that considers the potential establishment of these non-natives over time and the potential variations in water quality and water quantity in the Grand Canyon with lower Lake Powell elevations. The modeling would allow for a comparison between alternatives and demonstrate different trajectories between the alternatives that are important to decision-makers to assess the risk to humpback chub populations over time.

Given the expedited timeline for this EA and the intersection with the concurrent Reclamation Interim Guidelines Supplemental Environmental Impact Statement (SEIS), we strongly urge Reclamation to immediately provide U.S. Geological Survey (USGS) Grand Canyon Monitoring and Research Center (GCMRC) modelers with direction to conduct this modeling and the funding and any other resources needed, including additional staff, to conduct modeling according to the timeline. Additionally, this information will be useful and should be incorporated in the environmental documents for post-2026 operations.

Modeling should consider annual and multiyear impacts to fish and consider prioritizing those over impacts to hydropower. Again, Federal agencies have certain legal obligations to protect the environmental and other resource interests on the Colorado River in the Grand Canyon pursuant to the GCPA, the ESA and the NPS Organic Act.

#### Sandbars, Beaches, Cultural Resources and River Recreation

The alternatives in this process will influence the second major resource issue, sandbars and beaches in the Grand Canyon. Recent lower levels of Lake Powell have prevented the High Flow Experiments (HFE) from being carried out in the Grand Canyon since 2018. HFE's represent the only river-wide tool to rebuild sandbars and beaches in the canyon, critical for the protection of irreplaceable cultural resources in this park, also a UNESCO World Heritage site. There are approximately 362 recorded archeological sites in this part of the river corridor that could potentially be impacted by flows that impact sediment and wind-based processes. The sediment from these HFEs also provides the camping areas required for recreational access for river rafters through the canyon. These resources are mandated for protection under the GCPA.

This EA would need to consider compliance with the GCPA, the National Historic Preservation Act (NHPA) and the NPS Organic Act. Through consultation with the NPS and in the Glen Canyon Dam Adaptive Management Program, the Hualapai Tribe expressed concern that the lack of HFE's is causing sediment deposition in western Grand Canyon, promoting a buildup of sand in the river in areas where their river operations occur. This sediment buildup is creating a safety concern to visitors and has an impact on the Tribe's commercial recreational interests. Grand Canyon NP has similar concerns.

The effects of flow spike alternatives (Options B and D), which are designed to disadvantage smallmouth bass, would vary depending on whether the river channel is sediment rich or sediment poor at the time of the flows. Flow spikes in July (which is a new sediment accounting window) could reduce the chances of an HFE in the Fall months by depleting the sediment available in the channel, using the current accounting process under the LTEMP sediment protocol. This could be resolved with changes to the LTEMP protocols for low water conditions (see below in “alternative additions”). Whether the flow spikes are beneficial or detrimental to sediment in the longer term may also depend on the effects to vegetation that could increase or decrease aeolian (wind) transport of sand from the river channel to higher elevation dune fields where the sand buries and protects archaeological sites from erosion and visitor impacts. A single flow spike at higher magnitude and longer duration might redistribute more sediment onto the beaches and sandbars and accomplish the objectives of fall sediment-triggered HFEs. However, multiple flow spikes could also erode sand in the channel during the fall sediment accounting window. The magnitude of the flow spikes may affect how much scour of undesirable beach vegetation exists, and the timing of the flow spikes might determine if that spike is beneficial or detrimental to plant growth. We request that the alternatives be evaluated for these concerns using the modeling capabilities of GCMRC to estimate sandbar and beach erosion and rebuilding, the potential for vegetation to increase or decrease, the impacts to aeolian sediment supply to archaeological sites, and campable area. This would allow for the disclosure of how these alternatives impact the protection of cultural resources and river-based recreation through the Grand Canyon.

#### Water Quality in the Colorado River

Water quality impacts in the Colorado River through the Grand Canyon are a result of lower Powell elevations and the increases in river temperatures. Over summer 2022, water temperature in the river estimated approximately 5 degrees C warmer than the past 50 years combined, and depending on future hydrology numbers for summer of 2023, could result in an increase of 10 degrees C. The change from a baseline of 14 C to 24C (or 18-degree Fahrenheit increase) is a dramatic difference in a short duration for an aquatic ecosystem.

These major changes in temperatures would be above breeding temperatures of warm water non-native fish passing through the GCD. In addition to creating favorable temperatures for non-native fish, the warmer water would have additional negative impacts on aquatic communities. We recommend that this be analyzed in the no action alternative as well as the potential human health impacts for river recreation. It is our belief that the action alternatives that utilize bypass to lower river temperatures would address these concerns. The use of bypass is also likely to reduce dissolved oxygen problems in Lees Ferry and impacts to the rainbow trout fishery. These issues should be modeled using the modeling capabilities of GCMRC. The viability of bypass

option alternatives to improve the viability of native and endangered fish and the recreational trout fishery should be disclosed in this analysis to inform recreational anglers and environmental groups about the differences between the alternatives.

#### Traditional Cultural Properties and Values of Importance to Tribes

Many issues are important to tribal communities, from hydropower to recreation to water rights; however, within National Park units, our long consultation history with tribal partners has documented additional areas of special traditional importance. Some areas are documented Traditional Cultural Properties (TCPs), and others represent areas of traditional importance to tribal histories. Many Tribes consider the river a living entity, preserving it and considering it a significance spiritual importance. The river is thought of as the lifeblood of the Grand Canyon and the backbone of life for many Indigenous people of the area.

The Pueblo of Zuni and other Tribes have expressed concerns over mechanical and chemical fish control actions to manage non-native fish, though all Tribes have expressed the importance of maintaining the native fish in the river. The action alternatives for this process that use more bypass and as well as flow (such as Option B) may allow reducing the spread of the non-native fish the most, provide the most protection of the native fish by lowering the river temperature to where it is less suitable for the non-natives, and therefore may require less mechanical or chemical fish control actions. This information should be disclosed in this analysis so that if the Tribes prefer a preventative approach rather than an active management approach, they can distinguish between the alternatives this issue.

#### **Alternatives**

NPS respectfully asks that the following issues be considered in the alternative development process:

- Given the history of invasive species, it is critical that an alternative that proves to be effective at reducing both passthrough of these fish at the dam and reducing the potential for these species to reproduce below the dam is chosen. Warmwater invasive fish species present a high risk of impacting native fish species in the canyon, including the federally threatened humpback chub and the federally endangered razorback sucker. In the information available, the alternatives with the most frequent bypass use through the potential SMB breeding season appear to be the most effective alternatives. The bypass use appears to be critical to achieving both goals of reducing passthrough and reducing temperatures below the range at which these warmwater non-natives can breed effectively. It is imperative that the range of alternatives chosen are those that will be likely to stop reproduction before these fish are widely established through the canyon and in the tributaries; it may be impossible to eradicate them after they fully establish.
- Based on the analysis, Option B: Cold Mix with Spike Flow is expected to have high certainty of prevention under most conditions. This appears to be the most effective at preventing the establishment of new warmwater invasive fish below the GCD. If this remains the most effective option, then NPS will prefer this as the best approach for protecting native and federally listed fish. Options without flow spikes will fail to reach

fish in the backwaters. Option C appears to be less effective and more likely to result in a population level decline of federally listed fish in this system.

- We understand that bypass would have negative impacts to the hydropower production at the dam, and these flows will only be needed when Lake Powell elevations are between 3490' to between 3525'-3540'. If other Reclamation processes, such as the Supplemental EIS to the 2007 Interim Guidelines ROD, choose a 'protection elevation' for Lake Powell that is at or above 3525', the need to use these bypass flows may be reduced. A higher protection level would be beneficial for both power production and for protection of federally listed fish.

### **Modification to Flow Spike Alternatives (Option B and D) to Address Impacts to Sediment**

NPS would like to submit a modification to the flow spike alternatives that could modify LTEMP to reconcile sediment and fish needs at 'low water conditions.' This could be addressed in this EA or in the Interim Guidelines SEIS, whichever Reclamation believes is the most appropriate of the two processes to address these adjustments to the LTEMP protocols. Wayne Pullan articulated at the August 2022 Adaptive Management Working Group (AMWG) meeting tasks for GCMRC to find a way to address both the SMB invasion issue and the lack of HFEs in the Grand Canyon under these lower water conditions. Based on dialog with GCMRC researchers, these modifications below would resolve both issues to provide benefits to resources and better compliance with the GCPA, but also modify the LTEMP protocols in a way that would be more effective in terms of staff time and planning under low water conditions:

1. Low water conditions for this concept would be defined as when Lake Powell elevation is below 3550' (or as adjusted based on the best available information from GCMRC for a trigger level at which river temperatures or fish passthrough become problematic) and the annual release from GCD in the current water year is 7.0 maf or below.
2. In these low water conditions, a fall HFE or a spring HFE in March or April would not be considered. Either SMB flow spikes would be considered in the May to mid July timeframe, or if SMB flow spikes were not to be considered, a sediment triggered HFE between 24-72 hours would be considered in the May-June time window. The only modification to the SMB flow spikes would be, if a sediment trigger was reached, an extended duration flow spike between 36 hrs. and 72 hrs. on the first of the three possible flow spikes.
3. The LTEMP sediment accounting window would be altered to start and end on July 1 every year and would continue for the entire year rather than 2 separate periods. This would allow for, and limit it to, one sediment triggered HFE-type flow considered during a year (an HFE or the SMB flow spike). The SMB flow spike from May-July 1 would 'count' as an HFE if a sediment trigger was reached by May 1.
4. If there were higher water conditions (Lake Powell elevation is above 3550' or GCD release is => 7.0 maf), the LTEMP HFE protocol would still apply (with a single year-long accounting period). This would still allow for sediment triggered fall HFEs in Oct-Nov, spring HFEs in the Mar-April window, for extended duration HFEs, and for proactive spring HFEs in May-June, but the accounting window would still be a year long starting and ending July 1 and restricting it to only one sediment triggered HFE during that time period.

5. This adjusts the LTEMP protocols to function in ‘lower water conditions’ as suggested by Secretary’s Designee in the August AWMG meeting and would allow compliance with the GCPA in these conditions.

For Reclamation and other partners, we believe these additions would have these benefits:

1. This allows for NOT conducting fall HFE planning nor Mar-Apr spring HFE planning in low water years (less than 3550’ and release < 7.0 maf). This would save the time and effort for Reclamation staff, GCMRC researchers and the States’ technical staff. In addition, it would formally acknowledge that when the Lake Powell reservoir is lower (as defined above), it may be impractical to conduct HFEs in the standard LTEMP timeframe (when reservoir level is that low and lacking the volume and elevation during those time windows).
2. In low water years, it sets up a way to get sediment ‘credit’ for SMB flow spikes in most years (when sediment triggers are reached), meaning only one type of bypass flow rather than two, resulting in accomplishing two goals in one action.
3. For higher elevation or higher release years, it would maintain all types of HFEs allowed in the LTEMP protocol but limit it to one sediment triggered HFE on a 1-year accounting period. This could lead to decisions to forgo a fall HFE and increase the frequency of spring HFEs; however, that could offer benefits to other aquatic resources since this is the natural timing for peak flows in this system.

### **Intersections with other Planning Processes**

The Reclamation 2007 Interim Guidelines SEIS will interact with and influence this EA because the process would determine dam releases with respect to inflows and is likely to set a protected minimum operating range for Lake Powell elevations. If the protection elevation is set lower, for example to 3500’, it would greatly increase fish passthrough and increase river temperatures. It would greatly increase the chances of SMB establishment in the Grand Canyon and result in detrimental impacts to the humpback chub population from predation, unless the bypass operations contemplated in this EA were used frequently. If the protection elevation in the SEIS is set higher, for instance above 3540’, the likelihood of SMB passthrough and temperature related issues is greatly reduced and may reduce the need for bypass alternatives. This intersection should not be ignored because the lower the protection elevation, the more conflict appears between power needs and environmental impacts in this part of the system. If protection elevation is set higher, such as over 3540’ (if that is possible – we know it is below that now, but expect it would be above that in June and could potentially be maintained above that depending on the inflow spring of 2023 if the new SEIS adjusted outflows), there would be better protection of both hydropower for the western grid, environmental impacts and the native and federally listed fish in the Grand Canyon.

To the extent possible while meeting other water delivery mandates, protecting higher lake elevations would also allow for HFEs for continued protection of beaches, sandbars, cultural resources and river recreation in the Grand Canyon. Based on the information available at this time, operating the dam in this range would comply with the GCPA 1802a mandates and reduce conflicts in this part of the system, if it could be done while still meeting GCPA 1802b requirements.

Thank you for the opportunity to comment on this important and expedited process. We want to ensure full consideration of the impacts within the National Park units in this EA. We look forward to sharing available data and working closely with you as soon as possible on the modeling that can be performed on this timeline and ensure utilization of the best available scientific information from the GCMRC.

Please contact Rob Billerbeck, NPS Colorado River Program Coordinator, at 303-987-6789 or [rob\\_p\\_billerbeck@nps.gov](mailto:rob_p_billerbeck@nps.gov) if you have any questions on these comments or wish to discuss them further.

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National Park Service serving Department of Interior Regions 6, 7, & 8