



Department of Energy
Western Area Power Administration
Colorado River Storage Project
1800 South Rio Grande Avenue
Montrose, CO 81401-4800

December 15, 2022

SENT ELECTRONICALLY

Sarah Bucklin
Regional Environmental Coordinator
Compliance and Water Resources, UC-443
125 State Street
Salt Lake City, UT 84138
sbucklin@usbr.gov

Dear Ms. Bucklin:

Western Area Power Administration (WAPA) is providing the following input for the draft Environmental Assessment (EA) for Glen Canyon Dam as described in the December 1 stakeholder update. We applaud the Bureau of Reclamation (Reclamation) for preparing this National Environmental Policy Act (NEPA) assessment, analyzing the possible impacts, and involving various Glen Canyon Dam Adaptive Management Program (GCDAMP) stakeholders.

As stated in our pre-scoping letters dated October 26 and November 18, 2022, we offer our assistance in evaluating the hydropower impacts for the EA. WAPA has the technical expertise, data, and models to estimate electrical power impacts using the best available scientific information. Staff in WAPA's Colorado River Storage Project (CRSP) office have contributed to several of Reclamation's EAs and Environmental Impact Statements regarding the operation of CRSP dams. In addition, national laboratories have assisted WAPA in developing data and models that will be of assistance to Reclamation in preparing this EA. These projects are underway, and we appreciate the collaboration with Reclamation.

Reclamation's schedule for this EA is ambitious considering the number of resources and impacts that will need to be described. The purpose of this letter is to offer Reclamation feedback on the draft alternatives and identify areas of analysis that must be done for the hydropower section of the EA.

Electrical Hydropower Power Resources Potentially Impacted by the Federal Action

With the continued drought and low elevations at Lake Powell, we continue to be very concerned about the status of the Basin Fund and our ability to absorb impacts from experimental releases at Glen Canyon Dam. The Action Alternative being discussed may be of a scale that exceeds WAPA's ability to locate and purchase replacement electrical energy. If significant hydropower

impacts are identified, we need to work together to find ways to mitigate those impacts with appropriations or from some other Reclamation funding source.

We have listed here, the hydropower resources potentially impacted by Reclamation's Proposed Action. Each needs to be evaluated to determine if impacts exist and if so, whether the impacts could be significant.

Replacement power - availability: The electric industry is experiencing a period of great change. The introduction of intermittent resources coupled with the closure of traditional sources of electrical generation have reduced the availability of energy throughout the west. WAPA is currently experiencing difficulty in purchasing even modest amounts of energy on the market. WAPA does not know if replacement electrical power is available for the Flow Options that require water bypass and thus reduce energy production as part of the experiment.

On August 18, 2022, Glen Canyon Dam (GCD) produced almost 500 megawatts (MW) of clean, renewable energy during the hours of the afternoon peak. Simply put, if WAPA or its customers have to replace that energy, we do not believe replacement power will be available during peak summer months in 2023 at any price. This may result in impacts to the electrical grid and may, in the most severe cases result in customers losing power. This will most likely occur during episodes of high heat. An analysis must be completed to determine if replacement energy is available and if so identify if sources are from renewable sources or from fossil-fuel generation.

Replacement power - cost: There is considerable uncertainty in power costs for the summer of 2023. If GCD generation is reduced and replacement power is available, it will be costly. When generation at GCD is reduced, WAPA or its customers must replace that energy from alternate resources. That replacement energy is becoming extremely difficult to find and exponentially more expensive. For example, in January of 2023, where prices are historically \$30 to \$50 per megawatt, those prices have increased to \$250 to \$300 per megawatt. Summer prices are generally much more expensive than those prices in January. We are of the belief that WAPA cannot absorb those costs for a prolonged period of time without significantly impacting its ability to fund its requirements for CRSP operations and maintenance for both WAPA and Reclamation's programs.

Basin Fund: As mentioned above, WAPA must purchase replacement power up to the allocated amounts determined in our customer's contracts and rate. The EA will need to assess the impact these purchases might have on the CRSP Basin Fund and how a reduction in available funds might present risks to CRSP operations and maintenance.

Transmission: The transmission system was designed with generation at GCD as an integral component of the grid. It is unknown if the transmission system can accommodate the potentially significant change in energy and direction if generation at GCD is reduced to accommodate the Proposed Action. Reduced generation at GCD may result in transmission congestion, exceedance of transmission capacity limits and/or load shedding (i.e., blackouts).

Regulation, reserves, and emergency operations: WAPA has an obligation to supply regulation services, maintain reserve generation capabilities, and assist in emergency operations. These services are required to have a reliable electrical system. Historically, CRSP has relied on

GCD to provide these services. The CRSP units also provide ancillary electrical services such as voltage control, black start services, and emergency generation for neighboring entities such as the California Independent System Operator (ISO). Evaluating the possible impact of the Proposed Action on the reliability of the electrical system, and making accommodations for them, is an essential and required component of this EA.

WAPA’s Current Plan to Provide the Analyses Necessary to Identify Hydropower Impacts

WAPA has engaged the National Renewable Energy Laboratory (NREL) and Argonne National Laboratory (Argonne) to analyze the impacts the Proposed Action may have on the hydropower resources we have listed above. Using models recently configured for WAPA for a similar study, NREL, Argonne, and WAPA have begun the analyses Reclamation will need for the EA. We have simplified data requirements and methods so that the analyses will be completed by Reclamation’s target date and will make time for Reclamation to understand and review the analyses. We are willing to include Reclamation technical staff in this process to increase Reclamation’s involvement and understanding of the analysis.

General Comments

The Need statement for the EA is long, complex, and incomplete. The Need statement should reflect the Secretary’s Designee’s direction to “develop 2-4 operational alternatives that could help prevent cool- and warmwater invasive fish establishment, *while minimizing potential adverse effects to other resources.*” The Secretary’s Designee has also stated he envisions disturbance flows that are like the experimental SMB spike flows from Flaming Gorge which were developed in a way to minimize hydropower impacts. However, the Need statement does not describe how the Proposed Action was developed while minimizing potential adverse impacts to other resources. During the development of the Flow Options, WAPA worked with GCRMC to include at least one flow option that did not include bypass to minimize potential adverse impacts to the hydropower resource. This flow option, then called “Alternative 2”, included a short weekly release of 2,000 cubic feet per second (cfs) followed by a short flow spike to maximum generator capacity to disadvantage and disrupt smallmouth bass spawning. The proposed hydrograph was much like the one used in the Upper Basin in their experimental effort to reduce smallmouth bass spawning below Flaming Gorge. This flow option was omitted from the Proposed Action and replaced with another flow option that would substantially increase impacts to hydropower. Dropping this “Alternative 2” and including only flow options with bypass leaves Reclamation and the GCDAMP in a possible scenario where we may not be able to implement an action due to the potential impacts to the hydropower resource. A within powerplant low flow/flow spike, which may have the capability of reducing the likelihood of smallmouth bass establishing below the dam, would be a beneficial option to consider in the EA as it likely would not have a substantial negative impact on hydropower.

Other considerations include:

- The geographic scope for the EA should be clearly stated in the Purpose and Need and it should include the Colorado River mainstem and its perennial tributaries in Grand

Canyon down to Pierce Ferry. The EA should clearly state that reducing release temperatures with bypass might only reduce smallmouth bass establishment in the 72 miles of river between Glen Canyon Dam and the Little Colorado River (LCR) and might do little to help prevent establishment in the over 210 miles of river between the LCR and Lake Mead. Smallmouth bass establishment in western Grand Canyon would be detrimental humpback chub and put translocation efforts in Bright Angel and Havasu Creeks and the new western Grand Canyon aggregation at risk.

- We ask Reclamation to include at least one flow option that does not include the use of bypass but utilizes a daily fluctuation between 2,000 cfs and the maximum powerplant release (~18,600 cfs) to disadvantage and disrupt smallmouth bass spawning. This flow option would meet the Secretary's Designee's direction to minimize potential adverse effects to other resources like the hydropower resource while still providing an operation that would help prevent cool- and warmwater invasive fish establishment below Glen Canyon Dam. A description of this flow option was provided in our November 18 letter to Reclamation.
- We disagree with the assessment by GCMRC that higher daily flow fluctuations would not help prevent smallmouth bass establishment below Glen Canyon Dam. From the initial filling of Lake Powell to the early 1990's, pre-Record of Decision (ROD) flow fluctuations limited rainbow trout reproduction to the point that the fishery had to be sustained through stocking. The scientific literature suggests that smallmouth bass are more sensitive to flow fluctuations than rainbow trout (please see the USFWS Smallmouth Bass Habitat Suitability Index Model at <https://apps.dtic.mil/sti/pdfs/ADA323294.pdf> and compare with the Rainbow Trout Habitat Suitability Index Model at <https://usace.contentdm.oclc.org/digital/api/collection/p16021coll7/id/654/download>).

This would suggest that daily flow fluctuations like those used during the pre-ROD period could help prevent establishment of smallmouth bass in the tailwater and, since daily fluctuation waves travel all the way through the Grand Canyon to Lake Mead, they may be more effective at preventing establishment of smallmouth bass in the Grand Canyon than trying to reduce release temperatures with bypass. Fluctuating flows, including minimum flows outside the ROD restrictions, should not be discounted, or dismissed as being potentially effective in helping to prevent smallmouth bass establishment until they are tested.

- Considering recent increases in entrainment of smallmouth bass through the dam, the level of uncertainty as to whether flow fluctuations might help prevent the establishment of smallmouth bass is as high as the level of uncertainty of using bypass to cool release temperatures. Both hypotheses deserve testing, and consideration must be taken to reduce potential adverse effects to other resources as directed by the Secretary's Designee. We would suggest testing the flow fluctuation hypothesis first in 2023, and if that does not yield desired results, then consider testing the bypass hypothesis in 2024, which our preliminary analyses show may have substantial hydropower impacts.

- The Secretary’s Designee Directive on slide 15 of the stakeholder presentation of December 1, 2022, indicates that flow options like the one outlined above could be included in this EA but the “Considerations/Regulatory Constraint Considerations in Model” on slide 20 appears to limit flow options to within existing ROD operations for ramp rates and minimum releases. Why was the determination made to deviate from the Directive and limit the scope of flow options to those within ROD ramp rates and minimum releases? Please reconsider these limitations for these experimental flow options.
- The EA should provide an assessment of whether reducing release temperatures to ~14 degrees C in order to target a water temperature no greater than 16 degrees C at the LCR will completely eliminate spawning between Glen Canyon Dam and the LCR, including in the -12-mile slough and other off channel habitats. We have found references in the published literature that indicate that smallmouth bass spawning occurs in water temperatures as low as 12 degrees C (please see the USFWS Smallmouth Bass Habitat Suitability Index Model at <https://apps.dtic.mil/sti/pdfs/ADA323294.pdf>). We are concerned that the temperature target developed by GCMRC for the Action Alternative is too high to completely eliminate spawning, especially in the sloughs and other off-channel habitats between the dam and the LCR. Water has been found to warm in these habitats during the timeframe when smallmouth bass are likely spawning by as much as +4 degrees C during normal operations and by as much as +12 degrees C during steady flow experiments, (see slide 4 at <https://www.usbr.gov/uc/progact/amp/twg/2022-10-13-twg-meeting/20221013-UpdateNon-nativeFishGlenCanyonReachBelowGlenCanyonDam-508-UCRO.pdf>). Smallmouth bass are also more likely to use these off-channel habitats for spawning than habitats in the main channel. Flow Options C and D would mimic past steady flow options and would likely result in considerable warming in habitats like the -12 mile slough even though the main channel would remain cooler. Continued entrainment through the dam combined with the availability of warm off-channel habitats like the -12 mile slough will likely be a more important driver of smallmouth bass establishment than trying to keep water temperatures below 16 degrees C at the LCR. This is because off-channel habitats like the -12-mile slough will continue to warm above this 16 degree C smallmouth bass spawning threshold even if mainstem water temperatures are kept at between ~14 degree C and 16 degree C between the dam and the LCR.
- The EA should evaluate how flow fluctuations propagate down into western Grand Canyon and whether a flow fluctuation option might better prevent smallmouth bass establishment in western Grand Canyon than a flow option trying to reduce release temperatures. Flow fluctuations tend to persist all the way through the canyon and are affected primarily by river geomorphology and not distance from the dam like water temperature. In other words, fluctuating flows are likely to be a more effective tool at disadvantaging and disrupting smallmouth bass spawning below the LCR than manipulating release temperature.
- The flow options developed for this EA should be evaluated using a widely accepted, peer-reviewed, and published model.

- Reclamation should assess whether the flow spikes in Flow Options B and D might lead to the dispersal of green sunfish or other invasive species into Marble and Grand Canyons. We have heard repeatedly from GCMRC scientists on the concern for green sunfish, their continued increase in abundance in Glen Canyon, and their propensity to disperse during spring and summer flood events.
- The Flaming Gorge smallmouth bass flow spike experiment is more focused on reducing smallmouth bass habitat suitability through increasing flow fluctuations than by reducing temperature during the spawning season. Releases from Flaming Gorge change 5.4-fold (from 890 cfs to 4,800 cfs) during this experiment. We ask that Reclamation review the objectives and protocols for the Flaming Gorge smallmouth bass flow spike experiment and determine if a 9.3-fold change in releases from Glen Canyon Dam (from 2,000 cfs to the maximum powerplant release of ~18,600 cfs) would similarly disrupt spawning and help prevent establishment below Glen Canyon Dam. We also ask that Reclamation include an assessment whether a rapid decrease in flow would be more impactful to smallmouth bass spawning than a rapid increase in flow (please see the USFWS Smallmouth Bass Habitat Suitability Index Model at <https://apps.dtic.mil/sti/pdfs/ADA323294.pdf>).

We continue to be concerned about the status of the Basin Fund and our ability to absorb impacts from experimental releases at Glen Canyon Dam, as well as the availability of replacement power to offset lost hydropower generation. The Basin Fund is currently being supported with appropriated dollars and we continue to defer scheduled maintenance to maintain an adequate balance, as well as modify our deliveries to customers. The additional impacts of the Action Alternative to generation and transmission, the Basin Fund, and our customers, especially those utilities supporting underserved and disadvantaged rural and tribal communities, concern us very much. Based on our initial review of the Action Alternative, each component appears to be on a scale that will substantially impact hydropower operations and may result in what we would consider a significant impact to WAPA or our customers. For example, our initial analysis of Flow Option A for summer 2023 resulted in a ~\$60 million financial impact to WAPA. If significant hydropower impacts are identified, we will need to work together to find ways to mitigate those impacts with appropriations or from some other Reclamation funding source, or we may need to find some other operational release strategy that might help control smallmouth bass below the dam.

Sincerely,

**BRIAN
SADLER**

 Digitally signed by BRIAN SADLER
Date: 2022.12.15 16:34:39 -07'00'

Brian J. Sadler
Administrative and Technical Services Manager