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RECLAMATION

Supplement to the 2016 Glen Canyon Dam Long-Term Experimental and Management Plan

Record of Decision

July 2024
U.S. Department of the Interior
Bureau of Reclamation
Upper Colorado Basins
Interior Region 7



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RECLAMATION

Mission Statements

The Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and

Photo by Bureau of Reclamation, Operations Supervisor, Kato Miyagishima, June 2023, Flickr.com, Glen Canyon Dam at sunset

Record of Decision

Glen Canyon Dam Long-Term Experimental and Management Plan Supplemental Environmental Impact Statement


Recommending Official:



Camille Calimlim Touton
Commissioner, Bureau of Reclamation

Date JUL 03 2024

Approved:



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Summary of Action

The United States (US) Department of the Interior (Department), Bureau of Reclamation (Reclamation) has published a Final Supplemental Environmental Impact Statement (SEIS) for the Glen Canyon Dam Long-Term Experimental and Management Plan (LTEMP). The 2024 LTEMP SEIS revises the 2016 LTEMP Record of Decision (ROD) to address two issues: (1) responding to the threat of smallmouth bass below Glen Canyon Dam; and (2) incorporating the latest sediment science to assess when high-flow experiments (HFE) should be conducted. The following 16 cooperating agencies contributed to this Final SEIS: the Arizona Game and Fish Department, Bureau of Indian Affairs, Colorado River Board of California, Colorado River Commission of Nevada, Havasupai Tribe, Hopi Tribe, Hualapai Tribe, Kaibab Band of Paiute Indians, National Park Service (NPS), Navajo Nation, Pueblo of Zuni, Salt River Project (SRP), Utah Associated Municipal Power Systems, Upper Colorado River Commission, US Fish and Wildlife Service (Service), and Western Area Power Administration (WAPA). The US Geological Survey's Grand Canyon Monitoring and Research Center (GCMRC) provided technical review and modeling support throughout the process.

The proposed federal action considered in the 2024 LTEMP SEIS is to revise two aspects of the 2016 LTEMP ROD. The core focus of the 2024 LTEMP SEIS is the evaluation of sub-annual flow options designed to disrupt the establishment of smallmouth bass and other warmwater nonnative, invasive fish below Glen Canyon Dam by limiting additional recruitment, which could threaten populations of humpback chub (*Gila cypha*). The humpback chub is a species listed as threatened under the Endangered Species Act (ESA). A range of reservoir releases with varying combinations of temperature and release volumes was analyzed to assess their effectiveness in disrupting smallmouth bass spawning and preventing recruiting populations from expanding. Additionally, the 2024 LTEMP SEIS explored changes, using the best available science, to the sediment accounting periods associated with the LTEMP HFE protocol.

The project area encompasses Glen Canyon Dam and the Colorado River downstream of the dam to the inlet of Lake Mead. Lake Powell and Lake Mead are not within the project area. The analysis area may vary depending on the specific resource being considered. For instance, the cultural resources analysis encompasses a rim-to-rim area of potential effect, while the socioeconomic and hydropower analyses include surrounding counties and communities.

The 2024 LTEMP SEIS supplements the December 2016 LTEMP ROD for the 2016 LTEMP Final Environmental Impact Statement (EIS). The 2024 LTEMP SEIS and ROD were prepared in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality's NEPA regulations (40 Code of Federal Regulations 1500–1508), and Department regulations (43 Code of Federal Regulations 46). The decision made here is based on the Final SEIS filed with the US Environmental Protection Agency (EPA) on May 22, 2024; the EPA published a notice of availability in the *Federal Register* on May 31, 2024.

For this ROD, Reclamation has identified the Cool Mix Alternative as the preferred alternative for potential flow actions to address smallmouth bass during the summer of 2024. The Cool Mix Alternative would modify Glen Canyon Dam's sub-annual releases with the intent to disrupt the establishment of smallmouth bass below the dam to meet the purpose and need while minimizing impacts on other resources. For potential flow-based actions to address smallmouth bass after 2024 (if warranted based on temperature targets), Reclamation will consider the Cool Mix Alternative along with the other action alternatives described in the 2024 LTEMP SEIS, and will make implementation decisions from 2025 to 2027 based on future actual conditions.

Reclamation has also included adjustments to the high flow experiment (HFE) sediment accounting period and implementation window. These changes consist of adjusting the semiannual sediment accounting period to an annual period, with the option to implement a spring or fall HFE release, or both. If a sediment trigger is met, but an HFE release is not implemented in the fall or spring, rollover of sediment into the next accounting period would be possible.

Purpose and Need

The purpose of the 2024 LTEMP SEIS is for Reclamation to analyze additional flow options at Glen Canyon Dam in response to nonnative, invasive smallmouth bass and other warmwater, nonnative species recently detected directly below the dam. The recent detection of large numbers of young-of-year smallmouth bass suggests spawning is occurring for the first time directly below the dam. The need is to disrupt the establishment of smallmouth bass below Glen Canyon Dam by limiting additional recruitment, which could threaten populations of the threatened humpback chub below the dam.

The 2024 LTEMP SEIS's purpose relative to HFE releases is to consider adjusting sediment accounting periods and HFE implementation windows. The need is to include the latest scientific information to improve Reclamation's ability to implement HFE releases, as detailed in the 2016 LTEMP EIS.

Alternatives Considered

For the 2024 LTEMP SEIS, Reclamation considered six alternatives: the No Action, Cool Mix, Cool Mix with Flow Spike, Cold Shock, Cold Shock with Flow Spike, and Non-Bypass Alternatives. These alternatives were developed to address concerns from the public and stakeholders, ensuring a comprehensive evaluation of potential impacts and benefits in the Final SEIS. The range of alternatives reflects input from Reclamation, states, Tribes, cooperating agencies, stakeholders, and other interested parties, including comments received from the public during scoping and public comment periods.

As defined in the 2024 LTEMP SEIS, the cold-water alternatives underwent extensive analysis and modeling throughout the SMB EA and the 2024 LTEMP SEIS processes. Between the SMB EA and the 2024 LTEMP SEIS, the Non-Bypass Alternative was developed by WAPA and submitted for analysis. All action alternatives were discussed at Adaptive Management Work Group meetings.

A. No Action Alternative

Under the No Action Alternative, there would be no changes to operations at Glen Canyon Dam, as analyzed in the 2016 LTEMP ROD. If low reservoir elevations at Lake Powell persist, the No Action Alternative would result in continued warming of water and the spread of smallmouth bass and other warmwater, nonnative predatory species in the Colorado River below Glen Canyon Dam. This could harm native fish populations, including the federally protected humpback chub; therefore, this alternative would not meet the project's purpose and need.

If drought and aridification conditions continue, the No Action Alternative could also result in the continued trend of fewer and smaller HFE releases. The potential reduced number and magnitude of HFE releases would not optimize the best available science for sediment accounting.

B. Common Elements of Action Alternatives

Changes in Release Volumes

All non-flow spike alternatives could result in minor changes to total daily release volumes, depending on the dam's operations as coordinated by Reclamation and WAPA. The flow spike alternatives could result in shifts in total daily release volumes, but they would not alter monthly release volumes.

Temperatures

The cold-water alternatives have been modeled for cooling effects at river miles 15 and 61. Modeling these locations provides a representation of potential effects on resources at different river reaches. The trigger for implementation would be when observed temperatures exceed 15.5°C (60°F) for 3 consecutive days. Currently real time temperature data exists below Glen Canyon Dam and at Lees Ferry (river mile 0). There are additional gauges at river mile 30 and river mile 61, however these gages do not provide real time data, but can be downloaded remotely. For locations that do not have real time temperature data, the best available models would be used to determine trigger timing. The trigger location for the 15.5°C (60°F) threshold could be anywhere upstream of river mile 61, depending on the smallmouth bass distribution and size class, frequency and efficacy of sampling, or other considerations as determined through the planning and implementation process. Smallmouth bass distribution upstream of river mile 61 would be assessed based on the best available information and considered in the planning and implementation process, with the understanding that smallmouth bass sampling is limited below Lees Ferry and can have limited efficacy in assessing the locations of smaller size fish and of fish located in certain riverine environments where sampling is difficult. Smallmouth bass distribution upstream of river mile 61 will be assessed based on the best available information and considered in the planning and implementation process, with the

understanding that smallmouth bass sampling can have limited efficacy in assessing the locations of smaller size fish and of fish located in certain riverine environments where sampling is difficult.

Off-ramps

Potential off-ramps would be considered based on monitoring data. Off-ramps will occur if any unacceptable adverse impacts on the resources listed in Section 1.3 of the 2016 LTEMP ROD's Attachment B are anticipated. Off-ramps would also occur if the experiments prove to be inefficient at disrupting smallmouth bass spawning and meeting the purpose and need.

High Flow Experiments

All action alternatives would incorporate changes to the HFE sediment accounting period and implementation windows to use the best available science. These changes consist of adjusting the semiannual sediment accounting period to an annual period, with the option for a spring or fall HFE release, or both. If a sediment trigger is met, but an HFE release is not implemented in the fall or spring, rollover of sediment into the next accounting period would be possible. Implementation of an HFE release could result in a slight shift in total monthly release volumes. Additional information on the changes to the accounting period and implementation window is provided below in **Implementation and Changes to Attachment C: High-Flow Experiment Protocol for the Selected Alternative**.

C. Preferred Alternative (Cool Mix Alternative)

The Cool Mix Alternative aims to maintain a daily average water temperature below 15.5 degrees Celsius (°C) (60 degrees Fahrenheit [°F]) at the target river mile locations below Glen Canyon Dam where smallmouth bass could spawn. It would involve strategic water releases from both the penstocks and river outlet works, with quantities determined by predicted temperatures. Flows would be triggered when temperatures rise above 15.5°C (60°F), with variations based on monthly water volumes and conditions.

D. Cool Mix with Flow Spike Alternative

The Cool Mix with Flow Spike Alternative would maintain daily average water temperatures below 15.5°C (60°F) at the target river mile locations below Glen Canyon Dam. It would include up to three 8-hour flow spikes, with a maximum flow of up to 45,000 cubic feet per second (cfs), to disrupt spawning in margin habitats. HFE releases could replace flow spikes to maximize sediment benefits. Water releases would vary monthly based on predicted temperatures. Flow spikes and HFE releases would be similar but triggered differently. During a flow spike, peak discharge would be up to 32,000 cfs, moving about 133,000 acre-feet of water over 3 days.

E. Cold Shock Alternative

The Cold Shock Alternative aims to induce short-duration cold shocks, lowering temperatures to 13°C (55.4°F) at the target river mile locations below Glen Canyon Dam to disrupt smallmouth bass spawning and rearing. Flows would be activated when temperatures rise above 15.5°C (60°F), with cold shocks potentially occurring every weekend for up to 12 weekends, lasting 48 hours each. The goal would be to achieve rapid and sustained cooling of the river to disrupt spawning behavior. Actual release capacities may vary slightly based on operational constraints, and hydropower releases are assumed to be 2,000 cfs. Extreme high-temperature scenarios may limit reaching the target temperatures.

F. Cold Shock with Flow Spike Alternative

The Cold Shock with Flow Spike Alternative would involve releasing water through the river outlet works for 48 hours to induce a cold shock downstream to the targeted river mile. Up to three 8-hour flow spikes may also be implemented if enough water is available to disrupt spawning in warmer margin habitats. The release quantity would be based on predicted temperatures and operational constraints, which would vary throughout the year. This alternative would start when daily water temperatures at the Little Colorado River reach 15.5°C (60°F), with weekly 48-hour cold-shock releases and at least one 8-hour flow spike, lasting up to 12 weeks.

G. Non-Bypass Alternative

The Non-Bypass Alternative would involve strategic river stage changes along the Lees Ferry reach to disrupt smallmouth bass nests and spawning activities below Glen Canyon Dam. It would include a once-weekly, short-duration, low-flow release followed by a short-duration, high-flow release. The low-flow release would target shallow nesting areas, while the high-flow release would increase water velocities in deeper habitats. These releases would be designed to attenuate by the time they reach the Little Colorado River confluence. Flows would start on Sunday nights, peak on Monday morning, and return to normal by Monday afternoon. The treatment would be repeated weekly based on water temperature projections. This alternative aims to disrupt spawning at river mile 61, with adjustments possible during implementation.

Decision and Rationale for the Decision

For 2024, Reclamation selected the Cool Mix Alternative, identified in the Final SEIS as both the preferred alternative and the environmentally preferred alternative. For the reasons discussed below, the Cool Mix Alternative would best meet the proposed action's purpose and need. As described in the Service's letter in **Attachment A. US Fish and Wildlife Service Letter Regarding the Biological Opinion**, the Cool Mix Alternative would be within the operating parameters evaluated

in the LTEMP Biological Opinion (BO). The Cool Mix Alternative would be the most effective alternative in disrupting the establishment of smallmouth bass below Glen Canyon Dam and would not result in adverse modification of critical habitat of threatened and endangered species. Additional information can be found in the 2016 LTEMP BO.

For potential flow-based actions to address smallmouth bass after 2024 (if warranted based on temperature targets), Reclamation may consider the other alternatives described in the Final SEIS, including the Cool Mix Alternative, and make implementation decisions based on future actual conditions. Any decision to implement other flow options would require coordination and consultation with the Service to ensure any adverse effects on threatened and endangered species are addressed in a manner consistent with the ESA.

Reclamation made the decision to select the Cool Mix Alternative in 2024 and the option to include all other action alternatives for future years after carefully weighing biological, economic, cultural, tribal, and technical considerations. The decision-making process included consideration for the 2023 Glen Canyon Dam/Smallmouth Bass Flow Options Draft Environmental Assessment (SMB EA); internal and public scoping; qualitative and quantitative analyses using modeling and literature review; and extensive coordination with cooperating agencies, stakeholders, and Tribes.

LTEMP Purpose, Need, Objectives, and Resource Goals

This ROD does not change the purpose, need, objectives, or resource goals identified in the 2016 LTEMP ROD or Final EIS.

Development of the Cool Mix Alternative

Reclamation initiated a robust process for alternatives development in May 2022 during the development of the 2023 SMB EA. This included working closely with GCMRC to identify flow options based on temperature releases from Glen Canyon Dam. During this coordination, the Cool Mix Alternative was first developed. The 2023 SMB EA alternatives development process included a scoping and public comment period. Reclamation continued to refine the alternative during the 2024 LTEMP SEIS process through further scoping, public comment, and coordination with cooperating agencies, stakeholders, and consultation with Tribes.

Performance of the Cool Mix Alternative

Qualitative and quantitative analyses for 2024 demonstrated that the Cool Mix Alternative would outperform all other alternatives in meeting the purpose and need for the 2024 LTEMP SEIS. Smallmouth bass modeling conducted by GCMRC demonstrated that the Cool Mix Alternative showed the best chances of disrupting smallmouth bass establishment. Specifically, the Cool Mix Alternative modeling showed the smallest lambda value, which predicts the rate of population growth for smallmouth bass. The Cool Mix Alternative contains the same changes to the HFE

protocol as the other action alternatives and, therefore, would minimally outperform other alternatives for sediment resources.

Modeling conducted by WAPA and GCMRC shows that the Cool Mix Alternative would result in the greatest impacts on hydropower resources. While modeling indicated a wide range of hydropower effects, these effects were largely dependent on hydrology. The recent 2024 hydrology is anticipated to produce hydropower effects on the lower end of this wide range. Reclamation is and will continue to work closely with WAPA throughout the 3-year duration of this potential experimental flow to ensure impacts on hydropower are minimized when implementing flow option experiments.

The Cool Mix Alternative's impacts on all other resources would range from negligible to minor. Water quality would be improved during experiments resulting in cooler water temperatures and increased dissolved oxygen. Air pollution emissions could increase due to the change in hydropower generation. Total riparian vegetation cover would increase slightly. Cooler waters could benefit the rainbow trout fishery, thereby benefiting angling in the river. Tribal resources and environmental justice communities could be affected in the latter years if substantial impacts on hydropower generation continue. More information on all other resources can be found in Table 2-2 and Chapter 3 of the Final SEIS.

Summary of Comments on the Final SEIS

During the 30-day period after the EPA published its Notice of Availability of the 2024 LTEMP Final SEIS in the *Federal Register*, Reclamation received five comment letters from state, tribal agencies, and non-governmental organizations. These letters have been included in **Attachment D Comments on the Final SEIS**. No new issues were raised that would require further analysis. Below is a summary of comments received and responses from Reclamation.

Several commenters expressed concerns with the timeline of the 2024 LTEMP SEIS and subsequent actions, specifically stating that Reclamation should have considered other non-flow-based alternatives that they considered to be more efficient long-term solutions. Other commenters requested Reclamation explore additional solutions to the smallmouth bass issue by implementing fish barriers or modifications to the -12 mile slough. Several commenters requested Reclamation include additional details on several topics, including the changes to the HFE protocol and experimental flow off-ramps. A commenter requested additional analysis on the impacts to air quality, renewable energy, and hydropower markets. One commenter questioned the definition of Indian Trust Assets and suggested individuals with indigenous knowledge for a specific tribe should have been included as preparers for the SEIS. A commenter expressed disappointment that Reclamation's level of ESA analysis paid too little attention to protections for ESA-listed fish. Finally, several commenters expressed concern over the potential economic impacts from the reduction in hydropower generation.

Reclamation has stated the urgent need to implement actions in 2024 to address the issue of smallmouth bass spawning below Glen Canyon Dam and the risk to ESA-listed fish. Other actions, such as fish barriers or modifications of the -12 mile slough, would either not address the issue of existing smallmouth bass in the river or would not be implemented in time to address the issue in 2024, as described in Section 1.3 of the 2024 LTEMP SEIS. Reclamation is working on long-term solutions, including fish barriers at Reclamation facilities and is working with the NPS on a separate NEPA process to address the -12 mile slough within NPS-managed facilities, as described in Section 1.3 of the 2024 LTEMP SEIS.

Reclamation has updated the 2024 ROD to include additional information on the HFE protocol and potential off-ramp conditions based on comments received.

Reclamation has included the best available science and data in the Final SEIS, including a substantial contribution from WAPA in the Energy and Power Section 3.3. Impacts to hydropower vary greatly depending on hydrologic conditions. Recent hydrologies have shown impacts in 2024 could range from approximately \$5 million to approximately \$18M, which is on the lower end of the modeled impacts. As explained in Section 3.3.1 of the 2024 LTEMP SEIS, these experiments are non-reimbursable, meaning that hydropower customers will not be charged for the cost of experiments. If experiments reduce available hydropower for sale, WAPA will purchase replacement power through the Upper Colorado River Basin Fund (Basin Fund), and customers may need to seek replacement power from other sources depending on the amount of replacement power needed. Reduced amounts in the Basin Fund could affect hydropower considerations during sustained uses of the Basin Fund, process will include an assessment of Basin Fund considerations for potential experimental flows in 2024 and during the planning and implementation process for 2025-2027.

Reclamation has worked closely with the cooperating agencies on the development of the 2024 LTEMP SEIS and 2024 LTEMP ROD. This cooperation included data gathering and meetings with tribes. Reclamation made updates to the 2024 LTEMP SEIS based on comments received during the public comment period, these updates are outlined in Appendix A of the 2024 LTEMP SEIS.

Reclamation worked closely with the USFWS on the development of the 2024 LTEMP SEIS, including the incorporation of ESA compliance.

Reclamation coordinated with the cooperating agencies during the development of the 2024 LTEMP ROD. **Attachment C Responses to Comments from Cooperating Agencies** includes the comments received from cooperating agencies.

Refinement of Operational Guidelines for the Preferred Alternative in Response to Public Comments

A. Public Comment Considerations

In response to public, Tribal, and agency comments on the Draft SEIS, several additions were made to the chapters and appendixes in the 2024 Final SEIS. No changes to the alternatives were made as a result of comments received. Appendix A of the Final SEIS, Response to Public Comments, notes what has been changed in the Final SEIS based on specific comments. A summary of changes is as follows:

- The GCMRC published Modeling the Impacts of Glen Canyon Dam Operations on Colorado River Resources (Yackulic et al. 2024). This report supersedes the 2024 LTEMP Draft SEIS, Appendix A, Evaluation of LTEMP SEIS Alternatives on Smallmouth Bass. For that reason, the original appendix was removed and replaced with in-text references to the GCMRC report, which is hereby incorporated by reference.
- The hydrology section was updated to focus on sub-annual dam releases and to provide additional figures.
- The energy and power section was substantially updated to include additional input from WAPA and other stakeholders. This includes but is not limited to, WAPA's analysis of the impact on energy generation and value. This update also includes additional Plexos modeling results, as discussed below.
- Many resource sections now include additional analysis focused on impacts specifically during modeled traces that include experiments, along with analysis of average impacts across all modeled traces.
- The air quality section was updated with new analysis using the Plexos modeling results as a basis for data, as discussed below.
- The Center for Colorado River Studies published an independent study addressing smallmouth bass management. More information about this study is discussed below in **Section B, Additional Smallmouth Bass Information**.
- The Tribal resources and cultural resources sections were updated to reflect input from the Pueblo of Zuni.
- Information was added regarding the Interim Operating Guidance for Glen Canyon Dam during Low Reservoir Levels at Lake Powell report that was published between the Draft SEIS and Final SEIS.
- Minor updates were made across all sections based on public comments.

B. Additional Smallmouth Bass Information

Since the publication of the 2023 Draft SEIS, the Center for Colorado River Studies released a report reviewing smallmouth bass management in the Colorado River ecosystem (Smallmouth Bass Management Review Committee 2024). The study discussed the uncertainties in the risk of smallmouth bass establishment. Reclamation understands the inherent uncertainties but believes immediate actions are necessary due to the substantial risk of smallmouth bass establishment. The data indicate potential substantial consequences to threatened and endangered species in the river, and the challenge of addressing smallmouth bass will only increase if their population grows due to inaction. The need to act is based on empirical scientific data outlined in the Glen Canyon Dam Adaptive Management Program's (GCDAMP) Invasive Fish Species below Glen Canyon Dam: A Strategic Plan to Prevent, Detect, and Respond (GCDAMP 2023).

The Center for Colorado River Studies report identifies turbidity as a potential limiting factor for smallmouth bass establishment. While this analysis is derived from scientific studies in the Colorado River Basin, Reclamation lacks the ability to directly control turbidity levels that would allow for population control. Water temperature has also been shown to limit smallmouth bass establishment and can be manipulated by dam operations. The report identifies the Cool Mix Alternative as the most likely alternative to disrupt smallmouth bass establishment based on temperature considerations.

While the degree to which turbidity affects the establishment of smallmouth bass is uncertain, it is less likely to impact warmwater species such as catfish and walleye, which are more adapted to turbid conditions. Additionally, it is highly unlikely that turbidity would influence the establishment of warmwater fish in the Colorado River tributaries and the reach of the mainstem Colorado River above the Little Colorado River confluence, which is less turbid than downstream reaches.

Reclamation has considered the findings in this report, and additional information has been incorporated into Section 3.5, Aquatic Resources, of the 2024 LTEMP SEIS. Reclamation will consider any new information concerning smallmouth bass as it becomes available and will use the planning and implementation process to adaptively manage the Colorado River ecosystem.

C. Plexos Modeling

Since the publication of the 2024 Draft SEIS, Reclamation has coordinated with WAPA, the US Department of Energy's Argonne National Laboratory, and the National Renewable Energy Laboratory to incorporate Plexos modeling results to further analyze impacts on hydropower resources. This tool is widely used by the National Renewable Energy Laboratory and other organizations to simulate the operation of the electric power system on an hourly basis. Plexos conducts an optimization to determine the least-cost unit commitment and economic dispatch of every generator in the system. The modeling results and analysis on transmission, including the SRP exchange, reliability, availability of replacement power, ability to deliver replacement power, and source of replacement power, were included in the 2024 Final SEIS. Results and additional

information on the model are provided in Section 3.3, Energy and Power, of the 2024 LTEMP SEIS.

Environmental Commitments

The 2024 LTEMP SEIS does not result in any changes to the environmental commitments described in the 2016 LTEMP ROD. These include the commitment that Reclamation may make modifications under circumstances that may include operations that are prudent or necessary for the safety of dams, public health and safety, other emergency situations, or other unanticipated or unforeseen activities arising from actual operating experience (including, in coordination with the Basin States, actions to respond to low reservoir conditions as a result of drought in the Colorado River Basin).

A. Glen Canyon Dam Adaptive Management Program

The GCDAMP was established under the authority of the 1992 Grand Canyon Protection Act and initiated with the 1996 ROD for the Operation of Glen Canyon Dam Colorado River Project Final EIS. The GCDAMP provides an organization and process for cooperative integration of dam operations, downstream resource protection and management, and monitoring and research information for the purposes of protecting and improving the values for which the Glen Canyon National Recreation Area and Grand Canyon National Park were established. The GCDAMP will not be changed under the 2024 LTEMP SEIS; it will continue as described in the 2016 LTEMP ROD.

B. Protection, Mitigation, and Monitoring of Cultural Resources

Cultural resources include archaeological resources, historic and prehistoric buildings and structures, cultural landscapes, traditional cultural properties, ethnographic resources, and museum collections. Dam operations can affect cultural resources through mechanisms such as the periodicity of inundation and exposure, changing vegetation cover, stream bank erosion, slumping, and sediment availability. The Grand Canyon Protection Act, NEPA, and National Historic Preservation Act have varying responsibilities to address cultural resources and protect, mitigate, and monitor those that may be affected by the 2024 LTEMP SEIS. In addition, Reclamation is developing a memorandum of agreement (MOA) under the 2017 LTEMP programmatic agreement (PA) regarding nonnative fish control and flow actions under Glen Canyon Dam's operations. This MOA would replace existing Reclamation MOAs with the intention of resolving any adverse effects of LTEMP actions through the MOA's stipulations. Actions pertaining to cultural resources from the 2024 LTEMP SEIS will continue as described in the 2016 LTEMP ROD, 2017 LTEMP PA, and subsequent agreement documents.

C. Endangered Species Act Compliance

The ESA requires federal agencies to consult with the Service for actions that may result in effects on listed species. Reclamation worked with the Service to ensure the consultation process was sufficiently followed. The parameters of the preferred alternative in the 2024 LTEMP SEIS were examined under the framework of the 2016 LTEMP BO. Reclamation and the Service determined the effects of the current preferred alternative are sufficiently analyzed, and appropriate incidental take coverage is contained in the 2016 LTEMP BO. This process and agreement of determination are documented in the memorandum exchange included in **Attachment A. US Fish and Wildlife Service Letter Regarding the Biological Opinion**, of this ROD.

D. Commitments to Tribes

Reclamation recognizes the opportunities for cooperative and collaborative partnerships with Tribes in the management of federal lands and resources related to LTEMP, as stated in Secretarial Order 3342. In accordance with the 2017 LTEMP PA, traditionally associated Tribes shall be notified at least 30 days in advance of planned experimental flows. The Department is committed to finding beneficial uses with traditionally associated Tribes for nonnative fish that are mechanically removed as part of LTEMP actions, to the extent practicable. In addition, Reclamation is developing a MOA under the 2017 LTEMP PA regarding nonnative fish control and flow actions under Glen Canyon Dam's operations that would replace the existing MOAs; the intention is to resolve any adverse effects as a result of LTEMP actions. Reclamation's commitment to Tribes will not change under the 2024 LTEMP SEIS and will continue as described in the 2016 LTEMP ROD, 2017 LTEMP PA, and subsequent agreement documents.

Implementation

Implementation of flows described in the 2024 LTEMP SEIS will utilize the planning and implementation process for other experimental flows, as described in Section 1.3 of the 2016 LTEMP ROD. The planning and implementation process includes coordination and consultation with Department bureaus (the US Geological Survey, NPS, Service, Bureau of Indian Affairs, and Reclamation), WAPA, the Arizona Game and Fish Department, and one liaison from each Colorado River Basin State and from the Upper Colorado River Commission, as needed. Planning will involve an analysis of impacts on resources, including, but not limited to, sediment; threatened and endangered species; hydropower, including the Basin Fund; environmental justice communities; and Tribal interests. The implementation process will involve formal stakeholder engagement, including consultations with the Tribes in accordance with the 2017 LTEMP PA, to ensure fully informed implementation of this ROD. The Secretary of the Interior will make the decision regarding whether to initiate and/or terminate an experiment in accordance with the planning and implementation process described in the 2016 LTEMP ROD.

As described in the preferred alternative, implementation of this ROD for smallmouth bass flows is divided into two periods: 2024 and 2025–2027.

2024

For 2024, based on the likelihood of needing to respond to increasing river temperatures, this ROD provides guidance for smallmouth bass flow operations. A cool mix would occur when the average daily temperature at river mile 61 exceeds 15.5°C (60°F) for 3 consecutive days. The temperature data would be determined using real-time stream gage data at the dam and at Lees Ferry and existing downstream models (such as Dibble et al. 2021). The Cool Mix Alternative would be implemented until the mean daily water temperature (without bypass) falls below 15.5°C (60°F) at river mile 61. Temperature and biological monitoring would occur throughout this process to assess effectiveness. Gage data near river mile 61 would be accessed monthly during implementation to confirm temperature targets are being met.

A monitoring plan for 2024 has been outlined by the Department agencies and will serve as guidance for determining the status and effectiveness of the action. The monitoring plan can be found in **Attachment B. 2024 Monitoring Plan for Nonnative Fishes**. Potential off-ramp conditions will be monitored and considered to determine whether conditions warrant ending any experimental flows, as determined through the planning and implementation process. **Table 1** includes more information on potential off-ramp conditions.

This ROD provides initial notice for the potential implementation of smallmouth bass flows in 2024 if the appropriate temperature triggers are met. As of the date of this ROD, data indicates that temperature thresholds could be reached in July. As described in Section 1.3 of the 2024 LTEMP SEIS, there is a pressing need to address the ecological threat that smallmouth bass pose on the Colorado River downstream of Glen Canyon Dam. Potential smallmouth bass flows have been assessed in NEPA processes since May 2022, including participation by cooperating agencies. If implemented in 2024, the planning and implementation process will be used to assess monitoring results, including effectiveness of experimental flows and potential off-ramps. The planning and implementation process will be used for all aspects of smallmouth bass flow consideration in 2025–2027, as described in Section 2.3 of the 2024 LTEMP SEIS.

2025–2027

For smallmouth bass flows in 2025–2027, and as described in the preferred alternative, a broader range of smallmouth bass flows analyzed in the 2024 LTEMP SEIS will be considered for implementation, if conditions warrant, beyond the Cool Mix Alternative. Reclamation will consider the same factors described in the 2024 LTEMP SEIS, including any new information from previous years' experiments, to refine the criteria, implementation procedures, and off-ramps. To assess potential smallmouth bass flows to be implemented, Reclamation, in coordination with the Service, will prepare an analysis of current conditions, including the hydrology, water quality, Basin Fund (in coordination with WAPA), and fish populations. Reclamation will coordinate with the planning and

implementation team as defined in the 2016 LTEMP ROD to ensure all pertinent resources are analyzed prior to implementing a proposed flow. The implementation process will include formal stakeholder engagement, including consultations with the Tribes.

Implementation of this ROD, relative to the revised HFE protocol, will also follow the planning and implementation process as described in Section 1.3 of the 2016 LTEMP ROD.

Changes to Attachment B: Description of the Selected Alternative

Reclamation has added the following experiments shown in Table 1 to Table 4 in the 2016 LTEMP ROD. The column headings from Table 4 are unchanged and retain their original descriptions from the 2016 LTEMP ROD.

Table 1
Implementation Criteria for Experimental Treatments of Alternatives

| Experimental Treatment | Trigger and Primary Objective | Replicates | Duration | Annual Implementation Considerations | Long-Term Off-Ramp Conditions¹ | Action if Successful |
|-------------------------------|---|--|---|---|---|--|
| Cool Mix | Trigger: The temperature at the target river mile is higher than 15.5°C (60°F). Objective: Maintain a daily average water temperature below 15.5°C (60°F) at the target river mile. | Implement in each year triggered; limited to 2024–2027 | Implemented as long as temperatures at the target river mile are anticipated to be above 15.5°C (60°F). Anticipated to be limited to summer months. | Potential short-term, unacceptable impacts on the resources listed in Section 1.3 of the 2016 LTEMP ROD's Attachment B; unacceptable cumulative effects | Cool Mix releases are not effective in disrupting smallmouth bass population growth or, they lead to long-term, unacceptable adverse impacts on the resources listed in Section 1.3 of the 2016 LTEMP ROD's Attachment B. | Implement as adaptive treatment when triggered and existing resource conditions allow. |
| Cool Mix with Flow Spike | Trigger: The temperature at the target river mile is higher than 15.5°C (60°F). Objective: Maintain a daily average water temperature below 15.5°C (60°F) at the target river mile and a flow spike to disrupt smallmouth bass spawning. | Implement in each year triggered; limited to 2024–2027 | Implemented as long as temperatures at the target river mile are anticipated to be above 15.5°C (60°F). Anticipated to be limited to summer months. | Potential short-term, unacceptable impacts on the resources listed in Section 1.3 of the 2016 LTEMP ROD's Attachment B; unacceptable cumulative effects | Cool Mix with Flow Spike releases are not effective in disrupting smallmouth bass population growth or, they lead to long-term, unacceptable adverse impacts on the resources listed in Section 1.3 of the 2016 LTEMP ROD's Attachment B. | Implement as adaptive treatment when triggered and existing resource conditions allow. |

¹ Emergency criteria and facility operating guidance will continue to apply for all operations, including for short- and long-term off-ramps. See Section 3.3.1 of the Final SEIS for additional detail.

| Experimental Treatment | Trigger and Primary Objective | Replicates | Duration | Annual Implementation Considerations | Long-Term Off-Ramp Conditions ¹ | Action if Successful |
|----------------------------|---|--|---|---|--|--|
| Cold Shock | <p>Trigger: The temperature at the target river mile is higher than 15.5°C (60°F).</p> <p>Objective: Induce a short-duration cold shock, targeting 13°C (55.4°F) at the target river mile, to disrupt smallmouth bass spawning and rearing.</p> | Implement in each year triggered; limited to 2024–2027 | Implemented as long as temperatures at the target river mile are anticipated to be above 15.5°C (60°F). Anticipated to be limited to summer months. | Potential short-term, unacceptable impacts on the resources listed in Section 1.3 of the 2016 LTEMP ROD's Attachment B; unacceptable cumulative effects | Cold Shock releases are not effective in disrupting smallmouth bass population growth or they lead to long-term, unacceptable adverse impacts on the resources listed in Section 1.3 of the 2016 LTEMP ROD's Attachment B. | Implement as adaptive treatment when triggered and existing resource conditions allow. |
| Cold Shock with Flow Spike | <p>Trigger: The temperature at the target river mile is higher than 15.5°C (60°F).</p> <p>Objective: Induce a short-duration cold shock, targeting 13°C (55.4°F) at the target river mile, to disrupt smallmouth bass spawning and rearing; also induce a flow spike to further disrupt smallmouth bass spawning.</p> | Implement in each year triggered; limited to 2024–2027 | Implemented as long as temperatures at the target river mile are anticipated to be above 15.5°C (60°F). Anticipated to be limited to summer months. | Potential short-term, unacceptable impacts on the resources listed in Section 1.3 of the 2016 LTEMP ROD's Attachment B; unacceptable cumulative effects | Cold Shock with Flow Spike releases are not effective in disrupting smallmouth bass population growth or they lead to long-term, unacceptable adverse impacts on the resources listed in Section 1.3 of the 2016 LTEMP ROD's Attachment B. | Implement as adaptive treatment when triggered and existing resource conditions allow. |

| Experimental Treatment | Trigger and Primary Objective | Replicates | Duration | Annual Implementation Considerations | Long-Term Off-Ramp Conditions ¹ | Action if Successful |
|------------------------------|---|--|---|---|--|--|
| Non-Bypass | <p>Trigger: The temperature at the target river mile is higher than 15.5°C (60°F).</p> <p>Objective: Employ river stage changes along the Lees Ferry reach to disrupt smallmouth bass nests and spawning below Glen Canyon Dam.</p> | Implement in each year triggered; limited to 2024–2027 | Implemented as long as temperatures at the target river mile are anticipated to be above 15.5°C (60°F). Anticipated to be limited to summer months. | Potential short-term, unacceptable impacts on the resources listed in Section 1.3 of the 2016 LTEMP ROD's Attachment B; unacceptable cumulative effects | The Non-Bypass release pattern is not effective in disrupting smallmouth bass population growth or they lead to long-term, unacceptable adverse impacts on the resources listed in Section 1.3 of the 2016 LTEMP ROD's Attachment B. | Implement as adaptive treatment when triggered and existing resource conditions allow. |
| Sediment-Related Experiments | The triggers now consider an annual accounting period and the potential for sediment rollover between years. July 1 initiation of annual accounting for fall (October–November) and spring (March–June) implementation | No changes from LTEMP 2016 ROD | No changes to the duration of experiments | No changes to annual implementation considerations | No changes to off-ramps | No changes to the action if successful |

Changes to Attachment C: High-Flow Experiment Protocol for the Selected Alternative

All action alternatives incorporate changes to the HFE sediment accounting period and implementation windows to use the best available science. These changes consist of adjusting the semiannual sediment accounting period to an annual period (beginning July 1) with the option for a spring or fall HFE release, or both. If a sediment trigger is met, but an HFE release is not implemented in the fall or spring, rollover of sediment into the next accounting period is possible. Implementation of a fall HFE can occur in October or November. Spring implementation could occur from March through June, depending on resource conditions and the potential for implementation of the 2024 LTEMP SEIS cold-water alternatives that include flow spikes.

For the modeling, it was assumed HFE releases would be implemented in November or April, or both, depending on the alternative. Under the 1-year sediment accounting window, it was assumed that a spring HFE release is preferred to a fall HFE release; a spring HFE release was selected if modeling as of November 1 indicated that the release would be equal to or one duration level lower than the fall HFE release would be in that year.

Modeling also assumed that no HFE releases would be implemented below a Lake Powell elevation of 3,500 feet; this is because the HFE magnitude would be below 37,000 cfs, and a release could increase the risk of going below the power pool elevation of 3,490 feet. The power pool elevation is the depth below which the dam can no longer produce power. Under the 1-year window, if an HFE release were triggered but not implemented due to this constraint, and there were no other HFE releases in the accounting window, a positive sand mass balance would be carried over into the next accounting window.

Additional modeling assumptions for HFE releases are described in Section 2.5 of the 2024 LTEMP SEIS.

Planning for HFE releases will follow the planning and implementation process described in Section 7 of the 2016 LTEMP ROD, including close monitoring of all experimental treatments for unacceptable adverse impacts on important resources. Sand budget models will be run throughout the fall to determine whether sufficient sediment is available to conduct an HFE release. If sufficient sediment is available in the fall, the planning and implementation team may recommend conducting the fall HFE release or deferring implementation to the spring implementation window. Prior to the spring implementation window, the planning and implementation process will again be used to provide a recommendation on the duration, magnitude, and timing of the spring HFE release. If the HFE release is conducted, sediment accounting will restart on July 1. If, through the planning and implementation process, the recommendation is not to conduct an HFE release despite sufficient

sediment, the remaining mass balance at the end of June will be carried into the new accounting period.

In accordance with the planning and implementation process described in LTEMP, the Secretary of the Interior will decide to initiate and/or terminate an experiment.

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Attachment A

US Fish and Wildlife Service Letter Regarding the
Biological Opinion

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United States Department of the Interior

Fish and Wildlife Service
Arizona Ecological Services Office

9828 North 31st Avenue, Suite C3

Phoenix, Arizona 85051

Telephone: (602) 242-0210 Fax: (602) 242-2513



In Reply Refer to:

AESO/SE/

02EAAZ00-2012-F-0059

02EAAZ00-2014-CPA-0029

02EAAZ00-2022-0063848

May 31, 2024

Memorandum

To: Adaptive Management and Water Quality Division Manager, Bureau of Reclamation,
Salt Lake City, Utah

From: Field Office Supervisor, Phoenix, Arizona **HEATHER
WHITLAW**

Digitally signed by HEATHER
WHITLAW
Date: 2024.05.31 15:35:45 -07'00'

Subject: Response to Request for Agreement that Effects to Threatened and Endangered
Species for Flow Options Covered in LTEMP Biological Opinion

This letter responds to the Bureau of Reclamation's (Reclamation) May 21, 2024, memorandum requesting agreement that possible effects of Reclamation's Summer and Fall 2024 Cool Mix Alternative within the Long-Term Experimental and Management Plan (LTEMP) Supplemental Environmental Impact Statement (SEIS) are consistent, and covered, with analysis of the proposed actions identified in Reclamation's 2016 LTEMP Biological Assessment and the Service's 2016 LTEMP Biological Opinion (LTEMP BO). The purpose of the Cool Mix Alternative is to disrupt spawning for smallmouth bass (SMB; *Micropterus dolomieu*) within Glen and Grand Canyon Colorado River reaches. Should these invasive species of fish become established in the canyon-bound reaches between GCD and Lake Mead it would pose a threat to Humpback Chub (HBC; *Gila cypha*) and Razorback Sucker (RASU; *Xyrauchen texanus*) and their critical habitats. The U.S. Fish and Wildlife Service (Service) agrees with Reclamation's interpretation of ESA coverage. Coordinated efforts were made to address this threat and the Service was grateful to be part of the planning effort.

Proposed action

Reclamation was directed to pursue flow options at Glen Canyon Dam (GCD) to disrupt or prevent spawning of SMB and other invasive fish species that pass through the dam.

Reclamation is proposing to implement the Cool Mix Alternative for use in the summer and fall of 2024, should there be a need. Reclamation's final SEIS stated that "...proposed flow options would be conducted within normal operations as specified within the LTEMP Final EIS". Reclamation has indicated that the proposed Cool Mix Alternative is within the operations analyzed in the 2016 LTEMP BO.

The Cool Mix Alternative involves strategic water releases from both the hydropower generating penstocks and river outlet works (bypassing hydropower generation) to maintain a daily average water temperature below 15.5°C (60°F) as far down as river mile 61 (the confluence of the Little Colorado River). Reclamation has indicated there will be no change to the annual volume or monthly release patterns related to these flows.

Considerations for LTEMP BO

The proposed action was constructed to be implemented within the operational parameters identified in the LTEMP EIS and evaluated by the Service in the 2016 LTEMP BO. The parameters of the Cool Mix Alternative are within the base or High Flow Event (HFE) operating parameters evaluated in the LTEMP BO. As the proposed action will be implemented within the operational parameters of the base or HFE operating parameters, the effects of this proposed action were evaluated in the LTEMP BO (pp. 41-47 and 50-54). Additionally, the effects of non-native fish passing through the penstocks to the river below the dam were evaluated in the LTEMP BO (pp. 43). This is a proactive conservation action to address the risk posed by establishment of SMB to the native aquatic species below GCD including both HBC and RASU and their critical habitats. The proposed action is expected to have a net beneficial effect to HBC by disrupting SMB spawning and preventing the establishment of SMB populations in the river below the dam thereby minimizing predation threats to HBC.

Consequences of not conducting this action

The Service endorses this action because the science indicates that the risk of SMB establishment is reduced through cold water discharges intended to disrupt their spawning. Under conditions where SMB or other warm water nonnative predatory species become established in the Grand Canyon the predation threats to HBC become greater. Specific conservation measures intended to reduce the risk to SMB establishment and to provide environmental conditions suitable to ensure the continued existence of the HBC populations (inclusive of eradication of nonnative species), that are similar in intent to the proposed action here, are outlined in the LTEMP BO. These conservation measures were designed to benefit or improve the status of HBC as part of the LTEMP, as intended also by the proposed action. Possible effects of implementing these conservation measures were analyzed in 2016 and effects of this action are within the LTEMP BO analysis and compliance with the Endangered Species Act, Sec. 7 interagency consultation.

Agreement from the Service

We have reviewed the May 21, 2024, memorandum, considered the professional opinions of our biologists, and reviewed the FSEIS that Reclamation developed to address this need. We agree that Reclamation's proposed actions are in accordance with and analyzed in the LTEMP BO.

Further, we believe this temperature control experiment will provide an overall benefit to the HBC populations as opposed to taking no action.

Thank you for your continued coordination and commitment to conservation of threatened and endangered species. In all future correspondence on this project, please refer to the consultation number 2022-0063848. Should you require further assistance or if you have any questions, please contact Dan Leavitt, daniel_leavitt@fws.gov, of my office staff.

Cc (electronic) w/o enclosure: Project Leader, Arizona Fish and Wildlife Conservation Office (jess_newton@fws.gov)

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Attachment B

2024 Monitoring Plan for Nonnative Fishes

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Attachment B. 2024 Monitoring Plan for Nonnative Fishes

Overview

This document was created to provide an overview of the fish sampling, monitoring, and management effort that occurs in the Colorado River between Lake Powell and Lake Mead with particular reference to smallmouth bass (SMB) and portions of the river near Glen Canyon Dam (RM -15.7 to RM 7.5). This includes standard, long-term monitoring and other research-based monitoring/studies that are not specifically designed to detect or monitor nonnative fishes. This also includes sampling/removal effort specifically targeted for SMB. There are a number of potential questions about SMB that managers and scientists would like to answer. Some of these may be addressed with current monitoring, and others may require additional resources. These questions are detailed below.

Research Questions

(Note: not all questions will be addressed with the same certainty)

1. *Distribution/Dispersal:*
 - a. How are SMB distributed throughout the sampled area?
 - b. Are there changes in the distribution of catch over time suggesting movement/dispersal downriver?
 - c. Are there areas with consistent higher catch (i.e., hotspots)?
 - d. Are previously identified hotspots being sampled too little, adequately, or too much in relation to other potential sites?
2. *Reproduction:*
 - a. Is there in situ spawning occurring (metric: direct observations of eggs/larvae in nests or age-0 size SMB)?
 - b. When is spawning occurring?
 - i. Is the hatch phenology different in the mainstem vs backwater habitats?
 - c. Where is it spawning occurring?
 - ii. Where is age-0 catch concentrated?

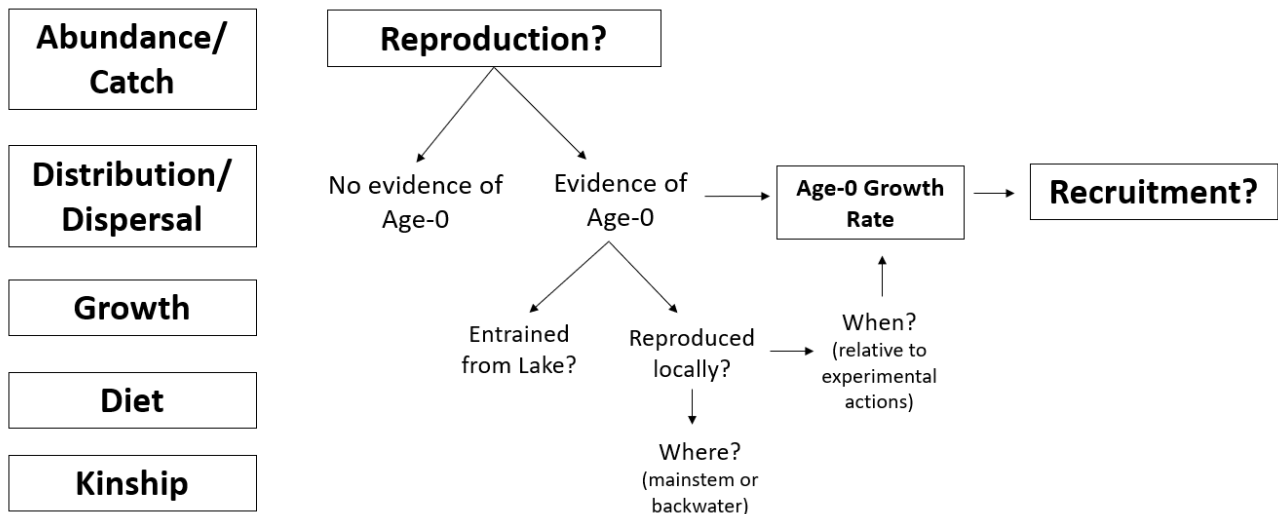
- iii. Can we use kinship analyses to identify whether recruits are being spawned in Lake Powell and entrained or produced locally? (requires additional genetic sampling of juveniles/adults in Lake Powell forebay).
 - d. Are age-0 fish recruiting to age-1 fish? (note: sampling from following year is needed to determine this)
- 3. *Abundance/Catch*:
 - a. How is subadult/adult CPUE related to entrainment and efficacy of removals?
 - b. Is subadult/adult Catch Per Unit Effort (CPUE) stable, increasing, or decreasing?
 - If stable or increasing, is that because of sampling that is focused on hotspots, increased capture efficiency as SMB grow, or ongoing entrainment?
 - If decreasing, how much is due to active removals, experimental flows, and/or natural mortality?
 - c. Can we tease out effects of environmental conditions (e.g., temperature) on capture efficiency to better isolate underlying change in abundance.
- 4. *Growth*:
 - a. What are the growth rates of subadult and adult SMB?
 - b. Is interannual or monthly variation mostly attributable to temperature or are other factors playing a role (e.g., changes in turbidity/prey densities in GRCA relative to GLCA)?
 - c. Is growth rate different in backwater habitats vs the mainstem river?
 - d. Does growth rate slow under potential experimental flows?
- 5. *Diet*:
 - a. What are SMB eating at different life stages in different locations?
 - b. How does stomach fullness and prey diversity change by location and life stage?
 - c. What are rates of piscivory as a function of SMB size?
- 6. *Capture Efficiencies*:
 - a. How efficient are different approaches to capturing different life stages?
 - b. Are there better approaches to catch early life stages and determine location of recruitment?
 - c. Are there better approaches to finding SMB nests/spawning areas?
 - d. Are there better approaches than electrofishing for removing SMB?

Measurable Goals/Objectives

- 1. Determine CPUE by life stage, distribution, and size structure of SMB to inform questions 1a, 1b, 2a, 3a, 3b, 4a, 6a.

2. Determine growth by life stage using modal progression analysis or potential otolith analysis to inform questions 4a, 4b, 4c, 4d.
3. Collect and preserve individuals to investigate kinship/relatedness and potential nest origin with genetics (questions 2a, 2c), diet (questions 5a, 5b, 5c) and potentially otoliths (question 2b, 4a, 4c, 4d) analyzed.
4. Test other approaches to capture different life stages of SMB (question 6).

Conceptual Flowchart



NPS Led Effort Overview

- A. GLCA: GCD to Lees Ferry sampling
 - a. Boat electrofishing (biweekly)
 - i. Fixed sites
 1. 24 sites have been selected as “Fixed” sites and are based on a mixture of Arizona Game and Fish rare non-native fish sampling sites, presence of suitable habitat for SMB, and/or where SMB were captured in 2022. There are three fixed sites per river segment, and they are sampled every trip.
 - ii. Random sites
 1. 184 sites were selected as “Random” sites where either <4 SMB were captured in the previous year of sampling Random sites (without replacement) allows sampling (over multiple trips) the broader river and identifying any emerging hotspots.
 - iii. Targeted hotspots
 1. 22 sites are identified as hotspots. Hotspots were selected based on 2022 captures of SMB in Glen Canyon when ≥ 4 SMB were captured from one

location. Hotspots are designed to move around if there are indications that SMB are becoming more abundant in certain areas and/or are declining in others.

- b. Targeted hotspot additional effort
 - i. -12 mile Slough barrier install and fish sampling/removal
 - ii. Fyke and hoop nets (biweekly)
 - iii. Artificial spawning beds (8 sites, weekly checks)
 - iv. Side scan sonar monitoring for spawning beds (pilot study)
 - c. Temperature monitoring
 - i. HOBO loggers
 - ii. USGS gages
 - d. GCD forebay sampling
 - i. Gillnets
 - ii. Minnow traps
- B. GRCA: Paria Beach to Badger Rapid (PBR) sampling
- a. Boat electrofishing (every 3 weeks)
 - i. Samples 2 out of 4 PBR reaches per trip
 - 1. Includes 3 pass depletion at dynamically selected sites chosen based on highest capture of SMB
 - b. Backwater/Targeted hotspot sampling (monthly)
 - i. Hoop net
 - ii. Seining
 - iii. Snorkel surveys
 - c. Temperature monitoring
 - i. HOBO loggers
 - d. Environmental DNA sampling
 - i. Backwaters and other hotspots

GLCA Schedule

| Week of | Trip |
|---------|----------------|
| Mar 5 | ELECTROFISHING |
| Apr 1 | ELECTROFISHING |
| Apr 8 | NETTING |
| Apr 15 | ELECTROFISHING |
| Apr 22 | NETTING |
| Apr 29 | ELECTROFISHING |
| May 6 | NETTING |
| May 13 | ELECTROFISHING |

| Week of | Trip |
|----------------|-------------------------------------|
| May 20 | NETTING; SLOUGH BLOCK NET INSTALL |
| May 27 | ELECTROFISHING |
| Jun 3 | ELECTROFISHING |
| Jun 10 | NETTING |
| Jun 17 | NETTING |
| Jun 24 | ELECTROFISHING |
| Jul 1 | ELECTROFISHING |
| Jul 8 | NETTING |
| Jul 15 | ELECTROFISHING |
| Jul 22 | ELECTROFISHING |
| Jul 29 | NETTING |
| Aug 5 | ELECTROFISHING |
| Aug 12 | ELECTROFISHING |
| Aug 16-19 | POTENTIAL SLOUGH CHEMICAL TREATMENT |
| Aug 19 | NETTING |
| Aug 26 | NETTING |
| Sep 3 | ELECTROFISHING |
| Sep 9 | NETTING |
| Sep 16 | ELECTROFISHING |
| Sep 23 | NETTING |
| Sep 30 | ELECTROFISHING |
| Oct 15 | ELECTROFISHING |
| Oct 28 | ELECTROFISHING |
| Nov 18 | ELECTROFISHING |

GRCA Schedule

| Date | Trip |
|---------------|------------------------------------|
| Apr 9-10 | PBR-BACKWATER |
| Apr 15-19 | PBR-ELECTROFISHING |
| May 7-8 | PBR-BACKWATER |
| May 20-24 | PBR-ELECTROFISHING |
| Jun 4-5 | PBR-BACKWATER |
| Jun 10-13 | PBR-ELECTROFISHING |
| Jun 19-30 | HBC AGG/NN Surveillance Downstream |
| Jul 8-12 | PBR-ELECTROFISHING |
| Jul 23-24 | PBR-BACKWATER |
| Jul 29- Aug 2 | PBR-ELECTROFISHING |
| Aug 13-14 | PBR-BACKWATER |
| Aug 19-23 | PBR-ELECTROFISHING |
| Sept 9-12 | PBR-ELECTROFISHING |
| Sept 23-30 | NN Surveillance SN/eDNA Downstream |
| Oct 7-10 | PBR-ELECTROFISHING |
| Oct 21-Nov 1 | NN Surveillance EF Downstream |

| Date | Trip |
|-----------|--------------------|
| Nov 11-15 | PBR-ELECTROFISHING |
| Nov 25-29 | PBR-ELECTROFISHING |

Routine, Interagency Monitoring Overview

(Subject to change in future years depending on budget)

- A. AZGFD: GCD to LF sampling
 - a. Boat electrofishing
 - i. 3 trips: Mar, Jul, (potential for Oct)
 - ii. Stratified random sites (upper, middle, lower)
- B. USGS: GCD to Lees Ferry, TRGD
 - a. Boat electrofishing
 - i. 4 trips: Jan, Apr, Jun, Nov
 - ii. Fixed sites (1A, near RM -13, 1C, near RM -4)

Downstream Effort Overview (to aid in high-risk nonnative detections)

(Subject to change in future years depending on budget)

- A. AZGFD
 - a. Spatially balanced, random sampling: LF to Pearce Ferry – electrofishing, hoop netting, angling
 - i. Apr, May, (potential for Fall trip)
 - b. Pearce Ferry to Pearce Ferry Rapid survey (RM 270-281.4)
 - i. (Potential for Fall trip)
- B. USGS
 - a. JCM East (near LCR confluence), JCM West (Western GC)– electrofishing, hoop netting
 - i. Apr/May, Jul, Oct
- C. USFWS
 - a. Aggregations 1: LF to Diamond Creek– backwater seining, hoop netting (hoops only below Havasu)
 - i. Jul/Aug
 - b. Aggregations 2: LF to Pearce Ferry – hoop netting, opportunistic seining
 - i. Aug/Sep

D. NPS

- a. Backwater and tributary mouth sampling: LF to Diamond Creek – seining, backpack electrofishing
 - i. Jun
- b. Upper half backwater sampling: LF to LCR – eDNA sampling, seining, backpack electrofishing
 - i. Sep
- c. Upper half sampling: LF to LCR – electrofishing
 - i. Oct/Nov

E. BOR- BioWest/ASIR

- a. System wide fixed sites: LF to Pearce Ferry – small bodied and larval fish sampling
 - i. May, Jun, Jul, Aug

General Protocol (differences will exist across agency protocols)

A. Sampling

- a. Boat electrofishing
 - i. Osprey boats with 1 operator and 1 netter
 - ii. 250-m sampling sites
 - iii. ~15-18 min/site (will vary based on agency specific objectives)
 - iv. CPS settings = 060 rate, 30.0 duty cycle, volt range high (300-600, switch up), Quadrapulse = off
 - 1. (AZGFD uses 240hz with Quadrapulse = on)
 - v. Nighttime
- b. Fyke and hoop nets
 - i. 24-h sets
 - ii. Set and checked during day

B. SMB processing

- a. Capture locations and effort are recorded for each site
 - i. CPUE including NFCs, hotspots, distribution
- b. All are measured
 - i. Track cohorts overtime, modal progression
- c. All are preserved individually in 95% ethanol
 - i. Genetics, for kinship
 - ii. Diets
 - iii. Potential otolith aging (larval/early juvenile stage only)

-
- C. Other fish species protocols (varies by location: LF vs downstream vs LCR; subject to change with IACUC protocols)
- a. AZGFD
 - i. Common carp are PIT tagged
 - ii. Rainbow trout are PIT tagged only in LF, during downstream sampling they are released alive
 - iii. Brown trout are PIT tagged only in LF, during downstream sampling they are removed for beneficial use
 - iv. All other invasive species are removed for beneficial use
 - b. FWS
 - i. Rainbow trout are released alive
 - ii. Common carp, channel catfish (LCR only) are PIT tagged
 - iii. Plains killifish, fathead minnow are released alive
 - iv. All other invasive species are removed for beneficial use
 - c. NPS
 - i. Rainbow trout are not netted nor handled
 - ii. Common carp are released alive
 - iii. All other invasive species are removed for beneficial use
 - d. USGS
 - i. Rainbow trout, brown trout (LF only), common carp are PIT tagged
 - ii. Plains killifish, fathead minnow are released alive with fin clip mark
 - iii. All other invasive species are removed for beneficial use

SMB Specific Processing Protocol

(Process striped and largemouth bass according to this protocol due to potential for misidentification)

- A. Fish can be bagged together by site and put on ice or in refrigerator for processing 12-24 hours later
 - a. The sooner they can be preserved the better
- B. Measure length (mm) on each individual
 - a. Both TL and FL are recorded
 - b. Fish shrink in ethanol, please measure prior to preservation
- C. Ideally each fish will be preserved individually in 95% ethanol
 - a. Fish can be batch preserved in ethanol, but not ideal
 - b. Large individuals may require multiple ethanol changes for preservation
 - c. Fish can be frozen if need be

- d. If preservation of large individuals is not practical, fin clips can be taken for genetics
 - i. Clip a “pinkie nail” size of fin and preserve in 95% ethanol
 - ii. Scissors for clipping do NOT need to be decontaminated
 - iii. Be sure to transfer all fish data to tag with fin clip
- e. If observed and captured, preserve SMB eggs/larvae in 95% ethanol

SMB Nest Observation Protocol

A. GLCA Artificial Spawning Beds

- a. Check weekly using polarized sunglasses and/or snorkel survey
 - i. If potential SMB spawning activity is observed: record data (date, time, location, # adults, eggs or larvae present)
 - ii. If SMB adult is observed: remove ASAP (potentially via angling if electrofishing is not available) and preserve
 - iii. If SMB larvae/eggs are observed: remove ASAP and preserve
 - iv. Report in Nonnative Database

B. Other SMB Spawning activity

- i. If potential SMB spawning activity is observed: record data (date, time, location, # adults, eggs or larvae present, and additional observations about habitat)
- ii. If SMB adult is observed: remove ASAP (potentially via angling if electrofishing is not available) and preserve
- iii. If SMB larvae/eggs are observed: remove ASAP and preserve
- iv. Destroy nest, if possible, by trampling, raking, etc
- v. Report in Nonnative Database
- vi. If possible, routinely check that location and surrounding habitat for signs of additional spawning activity

Codes

A. Habitat/Substrate

- a. CB - Cobble Bar
- b. CL - Cliff Ledge
- c. DB - Debris Fan
- d. SB - Sand Bar
- e. TA - Talus
- f. VS - Vegetation

B. Hydraulic

- a. BW - Backwater
- b. ED - Eddy
- c. GL - Glide
 - i. (flow is slow-moving, nonturbulent and laminar; water velocity too slow to be a run)
- d. RA - Rapid
- e. RI - Riffle
- f. RU - Run
 - i. (rapid flow, usually located downstream of riffles)
- g. SC - Side Channel

C. Fish Disposition

- a. BU - beneficial use
- b. DC - dead consumed
- c. DP - dead preserved
- d. DR - dead released
- e. RA - released alive

D. Nonnative Fish Species Codes

- a. BBH- Brown bullhead catfish
- b. BKC - Black crappie
- c. BGS - Bluegill sunfish
- d. CCF - Channel catfish
- e. CRA - Crayfish
- f. CRP - Common carp
- g. FHM - Fathead minnow
- h. GSF - Green sunfish
- i. GSFX – Sunfish hybrid
- j. GZD - Gizzard shad
- k. LMB - Largemouth bass
- l. MOS - Mosquitofish
- m. PKF - Plains killifish
- n. RBT - Rainbow trout
- o. RSH - Red shiner
- p. SMB - Smallmouth bass
- q. SPD - Speckled dace
- r. STB - Striped bass
- s. TFS - Threadfin shad

- t. TRT - Trout spp
- u. WAL - Walleye
- v. YBH - Yellow bullhead catfish
- w. UIB - Unidentified bullhead catfish
- x. UIC- Unidentified catfish
- y. UID - Unidentified
- z. UIF - Unidentified fry
- aa. UIS - Unidentified sunfish
- bb. NFC - No fish caught

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Attachment C

Responses to Comments from Cooperating Agencies

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Attachment C. Responses to Comments from Cooperating Agencies

| Comment | Response |
|--|---|
| Please reword sentence: "Any decision to implement other flow options would require coordination and could result in consultation with the Service to ensure that any adverse effects to threatened and endangered species are addressed in a manner consistent with the ESA." | The Final ROD has been updated per the comment. |
| Please review and consider revising grammar for sentence starting with "Reclamation understands..." to identify that we are concerned about the risk of smallmouth bass establishment. | The Final ROD has been updated per the comment. |
| Consider rewording: "threaten populations of threatened" to threatened populations of ESA-listed. This would avoid reduplication of the term "threaten". | The Final ROD has been updated per the comment. |
| This evaluation only discusses critical habitat. Perhaps consider adapting a sentence about effects to the species. | The Final ROD has been updated per the comment. |
| This does not capture how compliance was completed in this circumstance. Consider writing a couple sentences describing that explain the letter exchange and compliance with the previous Biological Opinion (LTEMP 2016). | The Final ROD has been updated per the comment. |
| Was the signature purposefully removed? We can provide another version of the signed letter if preferred? | The Final ROD includes the signed letter. |
| The Colorado River Board of California (CRB) appreciates the urgency with which this process is being completed in an attempt to prevent smallmouth bass establishment below Glen Canyon Dam. | Thank you for recognizing the urgency of this process. Reclamation shares your commitment to preventing the establishment of smallmouth bass below Glen Canyon Dam. |

| Comment | Response |
|--|---|
| <p>CRB is concerned that the Draft ROD lacks crucial details, such as when each individual experiment may be appropriate or inappropriate during 2025-2027 as well as criteria to evaluate offramp considerations. The planning and implementation team makes every effort to achieve consensus recommendations. Clear guidance in the Final ROD is necessary to both optimize the opportunity for a consensus recommendation and to ensure that stakeholders not participating in the planning and implementation team have ample opportunity to contribute to the decision-making process.</p> | <p>Clarifying language has been added to the Final ROD regarding experiments in 2025–2027 as well as off-ramp considerations.</p> |
| <p>CRB remains concerned that the option for sediment rollover is to be included without potential effects having been analyzed in the Final SEIS. It is recommended that sediment rollover not be incorporated in LTEMP until guidance can be provided and analyzed regarding how it will be implemented (i.e. How long can sediment rollover for accounting purposes? How reliable is modeling for sediment rollover?).</p> | <p>Clarifying language has been added to the <i>Changes to Attachment C: High-Flow Experiment Protocol for the Selected Alternative</i> section in the Final ROD.</p> |
| <p>Suggested revision for clarification: The <u>potential</u> reduced number and magnitude of HFE releases will not optimize the best available science for sediment accounting <u>achieve LTEMP sediment resource goals.</u>"</p> | <p>The sentence has been revised to include the word "potential." Maintaining the reference to the best available science is crucial, as this update reflects Reclamation’s improved ability to account for sediment.</p> |
| <p>Please include a statement that in accordance with the planning and implementation process described in LTEMP, the decision regarding whether to initiate and/or terminate an experiment will be made by the Secretary of the Interior.</p> | <p>The Final ROD has been updated per the comment.</p> |

| Comment | Response |
|---|---|
| <p>The Draft ROD states that a cool mix will occur when the average daily temperatures reach 15.5°C. The Draft ROD also states that "gauge data near river mile 61 will be accessed monthly during implementation to confirm temperature targets are being met." It is unclear how decisions will be made based on a particular day if gauge data is being obtained monthly. Will the model rather than gauge data be used to determine daily temperatures for potentially beginning and ending an experiment? If at all possible, it is recommended that gauge data be obtained a minimum of three times daily to obtain an average daily temperature. If model data is to be relied upon, an error factor should be applied to model results to assure actual river temperatures do not exceed the target temperature as such a situation could result in the inability to assess the effectiveness of the experiment protocol.</p> | <p>Real-time data at the dam and at Lees Ferry and the best available models will be used to determine temperature triggers. Once triggered, the gage at river mile 61 will be accessed at least monthly to confirm the modeled target temperatures are accurate. The ROD has been updated accordingly.</p> |
| <p>There is a potential typo in the "Action if Successful" column for all experimental treatments. Suggested revision: "Implement as adaptive treatment with <u>when</u> triggered and existing resource conditions allow."</p> | <p>The Final ROD has been updated per the comment.</p> |
| <p>Please clarify what is intended by "-continuous weekly hydrographic pattern." It is unclear how this item is to be used as a trigger.</p> | <p>This language was removed from the table.</p> |
| <p>Recommend stating "July 1 initiation of annual accounting for fall (Oct-Nov) and Spring (March - June) implementation" within Table 1 for ease in referencing during implementation.</p> | <p>Language has been added to the Final ROD.</p> |
| <p>"Triggers now consider.... and the potential for sediment rollover between years as described below." The criteria for sediment rollover do not appear to be specified in the Final ROD. CRB recommends removing the option for sediment rollover until analysis has been completed and guidance for implementation is available.</p> | <p>Clarifying language has been added to the <i>Changes to Attachment C: High-Flow Experiment Protocol for the Selected Alternative</i> section in the Final ROD.</p> |
| <p>Please include a statement that in accordance with the planning and implementation process described in LTEMP, the decision regarding whether to initiate and/or terminate an experiment will be made by the Secretary of the Interior.</p> | <p>Language has been added to the Final ROD.</p> |

| Comment | Response |
|---|---|
| <p>SRP seeks a notification period of no less than 30 days prior to the start of any experimental flow operations. This enables us a reasonable period to determine and execute a trade strategy necessary to prudently manage our portfolio. SRP seeks an emergency provision to which any experimental flow operation may be halted for the betterment of regional reliability.</p> | <p>Implementation for 2024 has been discussed since 2022, and the timeline does not allow for a formal planning and implementation process in 2024. Reclamation will ensure NEPA compliance in future years.</p> <p>The emergency criteria exception will continue to apply. The criteria are sufficiently broad to cover exceptions to this experiment. Recent instances invoking the emergency exception criteria have been limited to a few days per year and only a few hours within each of those days. The emergency criteria remain in place, which means the experiments could be interrupted for short-term incidents lasting hours or days.</p> |
| <p>Please clarify whether the Cool Mix alternative will modify total releases on a daily or monthly basis. Will the alternative result in increases or decreases to total daily or monthly release volumes, or will modifications in releases be limited to blending bypass releases with penstock releases?</p> <p>Page 2 of the USFWS letter (second paragraph) states: "Reclamation has indicated there will be no change to the annual volume or monthly release patterns related to these flows." Please confirm that the needed flexibility in adjusting monthly volumes for hydropower (and other resource) needs will remain in place as outlined page 2 of the LTEMP ROD: "Within a year, monthly operations may be increased or decreased based on factors referenced in Sections 1.2 and 1.3 of Attachment B of this ROD."</p> | <p>Clarifying language about the adjustments to release volumes was added to the Final ROD.</p> |

| Comment | Response |
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| <p>The discussion of the HFE component of the preferred alternative is minimal with some missing details that WAPA would like to see described. The impacts of the HFE-only component of the alternative on resources such as hydropower production are still uncertain. Recommend clarifying the statement on sediment roll-overs in this section, including when and how would they occur. We understand sediment a rollover would only occur in years with enough sediment to implement an HFE but where the HFE wasn't implemented due to other resource concerns (e.g. green sunfish, low reservoir elevations, etc.). Is this still the case? WAPA is most concerned about decision timing for a spring HFE that could impact summer releases. We would like to see more description of the process leading to a spring HFE to ensure water is reserved from earlier in the year for the HFE rather than having water taken from the summer for the HFE.</p> | <p>Clarifying language has been added to the <i>Changes to Attachment C: High-Flow Experiment Protocol for the Selected Alternative</i> section in the Final ROD.</p> |
| <p>There are a few points that could be clarified with regard to implementation of bypass in 2024, as well as from 2025 to 2027. First, will there be a P&I team discussion in 2024 or is the ROD making this decision and we will move directly to implementation if triggered in 2024? Second, in 2025 and beyond there will be a P&I process that considers all strategies for SMB management including spikeflows and non-bypass flows. If this process results in selecting different alternatives in future years, does Reclamation intend to publish amended RODs to address such changes?</p> | <p>Implementation for 2024 has been discussed since 2022, and the timeline does not allow for a formal planning and implementation process to initiate potential flows in 2024. Any flows considered after 2024 will also be fully consistent with NEPA and other applicable criteria.</p> |
| <p>Please clarify the trigger for implementing SMB flow actions. River mile targets in the ROD are described based on "status" of SMB. Please clarify what is meant by "status" or perhaps "presence," which is also used. Does it mean an increasing smallmouth bass population below the dam? Are catch rates continuing to increase from 2022 and 2023 and has SMB presence been identified at RM 61? The ROD further states that other RM targets could be used upstream of RM 61. WAPA would support upstream targets as it feels unnecessarily risk-averse to go to the most conservative and impactful approach of cooling to RM 61 without evidence of any SMB being present in that reach of the river.</p> | <p>The status of smallmouth bass is based on their distribution, size classes, sampling efficacy, and sample size. The choice of river mile 61 is due to the low capture probability of smallmouth bass and the limited sampling in the Marble Canyon Reach. Smallmouth bass were identified at river mile 16 in 2023; due to limited sampling in Marble Canyon, it is possible that smallmouth bass have moved farther downstream. Additional sampling in 2024 will improve Reclamation's understanding of the distribution to help inform future decisions about river mile targets.</p> |

| Comment | Response |
|---|--|
| <p>The Action Alternatives would impact power generation at Glen Canyon Dam during the peak summer power months. Changes in dam operations would reduce available generating capacity under all four bypass alternatives. This reduction in capacity would need to be replaced by purchases and generation from other sources. The estimated financial impacts from the selected alternative could exceed \$220 million, depending on the reduction in the amount of power generated and the cost to purchase replacement power. Reclamation does not indicate mitigation to reduce these impacts and how this relates specifically to off-ramps.</p> | <p>The estimated numbers in the comment represent a worst-case scenario and are befitting to current conditions. Hydropower generation and the Basin Fund are considered under the planning and implementation process. Reclamation will work with WAPA and stakeholders to continually assess hydropower and respond to unacceptable adverse impacts.</p> |
| <p>The hydropower section included more updates than just the Plexos modelling described here. Completely new hydropower analyses were introduced that were not included in the public draft. These include, but are not limited to, WAPA's analysis of the impact to generation and value of energy (Tables were blank in DFSEIS) and capacity. Additionally, new analyses by Argonne and NREL on transmission including the SRP exchange, reliability, availability of replacement power, ability to deliver replacement power, and source of replacement power were first introduced the the FSEIS. The ROD should specifically identify these data as new information first presented in the FSEIS. The ROD and the FSEIS both fail to include NREL's analysis of the impacts to locational marginal prices (LMPs) for energy associated with reducing generation from Glen Canyon Dam. This is an important economic impact that should be described and considered in the decision.</p> | <p>The Final ROD has been updated per the comment.</p> |
| <p>WAPA continues to believe it is not statistically accurate and inconsistent with past practices to include hydrographic traces where no experiment occurs in describing averages of potential hydropower impacts. Doing so conflates two concepts, the likelihood of an event occurring and the impact of the event if it does occur. Conflating these concepts creates the appearance of minimizing potential impacts and might lead the public to underestimate the potential impact to the hydropower resource of Reclamation's decision. It is also unnecessary to include GMCRC's partial analysis in the final SEIS because that analysis is included in the analysis prepared by WAPA.</p> | <p>Reclamation considers displaying both statistical analyses appropriate to provide a comparison among alternatives. The 2024 LTEMP SEIS includes an express discussion of the statistical issue raised in this comment.</p> |

| Comment | Response |
|---|--|
| <p>This text indicates Reclamation will implement in 2024 when the temperature target is reached at RM 61 (the LCR), regardless of whether smallmouth bass are detected in that reach of the river. This is contrary to how the trigger was described in the draft SEIS, which stated that presence of smallmouth bass would be included in a trigger. Please explain this change and why the presence of smallmouth bass at the LCR has been omitted. Please clarify whether the Dibble model or the 2D model will be used to determine downstream temperatures for a trigger. WAPA understands the 2D model better predicts changes in hourly release temperatures as water moves downriver. Also, please specify whether actual temperatures at RM 61 will be retrieved monthly or every 2 weeks. WAPA prefers more frequent data retrieval, especially if changing the temperature blend on an hourly/daily basis, will help mitigate impacts to hydropower value.</p> <p>WAPA has not seen the monitoring plan nor a science plan that would help us better understand how this experiment will be evaluated and how success will be measured.</p> <p>Given the uncertainty of establishment below the Paria River, is it necessary to be so risk adverse in Year 1 (2024) as to implement this action? Several factors seem to weigh against this approach, including that smallmouth bass have yet to be detected below RM 15, the distribution and abundance of smallmouth bass in the tailwater appear to be driven more by entrainment than local reproduction, catch rates of smallmouth bass in the tailwater may be declining (and this may be due to decreased entrainment from higher reservoir elevations and not cooler release temperatures), and the modification of the -12 mile slough in 2024 that may fix the one place where smallmouth bass have been found reproducing in the tailwater. Additionally, work continues to see if smallmouth bass are spawning anywhere other than the -12 mile slough, NPS is removing bass that were entrained in 2022 and 2023, and the Post-2026 EIS will likely evaluate ways of keeping elevations in Lake Powell above the level where bass are entrained. We ask Reclamation to weigh carefully the impact this action will have to the Basin Fund and the programs it supports with the need to implement this action before these critical uncertainties are evaluated.</p> | <p>Clarifying language has been added to address triggers for experiments.</p> <p>The monitoring plan has been added to the Final ROD.</p> <p>The choice of river mile 61 is due to the low capture probability of smallmouth bass and the limited sampling in the Marble Canyon Reach. Smallmouth bass were identified at river mile 16 in 2023; due to limited sampling in Marble Canyon, it is possible smallmouth bass have moved farther downstream. Additional sampling in 2024 will improve Reclamation’s understanding of the distribution to help inform future decisions about river mile targets.</p> |

| Comment | Response |
|---|--|
| <p>Please clarify the "Long-Term Off-Ramp" conditions mentioned and referenced in Table 1. What is meant by Long-term under this 4-year action? At what point would impacts to hydropower or the Basin Fund be an off-ramp consideration given the analysis showed potentially large impacts to hyrdopower value, the Basin Fund, and potential grid impacts and LMPs?</p> | <p>Table 1 is replicated from the 2016 LTEMP ROD. Reclamation will work with WAPA and stakeholders to continually assess hydropower and respond to unacceptable adverse impacts.</p> |
| <p>WAPA appreciates this statement and has been included in pre-planning for the experiments in 2024. There is a lot of work to be done to implement such a complex experiment with likely changing conditions. WAPA has developed a new optimization tool with Argonne National Laboratory that should help to inform when to schedule bypass releases to minimize purchase power costs and has identified some needed flexibilities in order to implement.</p> | <p>Reclamation appreciates WAPA's support during this process and looks forward to continuing close coordination.</p> |
| <p>The report by the Smallmouth Bass Management Review Committee (2024) released by the Center for Colorado River Studies at Utah State University identifies several critical uncertainties concerning whether smallmouth bass could establish in Grand Canyon near the LCR or in western Grand Canyon, and if they were to establish whether they would have a population level impact on humpback chub. Given the hydropower impacts of this action, we suggest further investigation of these uncertainties before this action is implemented. Improved hydrology in 2024 has increased elevations at Lake Powell, and entrainment of smallmouth bass through the dam appears to have decreased. Recent studies on the parentage and distribution of SMB collected in 2022 and 2023 indicate that the majority of those fish were entrained from Lake Powell rather than produced in the tailwater (Rapid Response call notes, 5/15/2023). Smallmouth bass catch rates in the tailwater appear to be lower in 2024 than in 2023, are still dominated by non-reproductive juvenile bass, and no SMB have been collected below river mile 15. These indicators suggest there is time to further investigate and implement control measures that have less of an impact to hydropower production and the programs it supports. Eliminating entrainment should continue to be the primary focus in keeping smallmouth bass from establishing below the dam.</p> | <p>The status of smallmouth bass is based on their distribution, size classes, sampling efficacy, and sample size. The choice of river mile 61 is due to the low capture probability of smallmouth bass and the limited sampling in the Marble Canyon Reach. Smallmouth bass were identified at river mile 16 in 2023; due to limited sampling in Marble Canyon, it is possible that smallmouth bass have moved farther downstream. Additional sampling in 2024 will improve Reclamation's understanding of the distribution to help inform future decisions about river mile targets.</p> <p>Hydrologic conditions in 2024 are still below average and, at best, neutral on reservoir elevations.</p> |

| Comment | Response |
|---|---|
| <p>The draft ROD states: "Reclamation lacks the ability to directly control turbidity levels that would allow for population control [of smallmouth bass]." However, there is a substantial history in the GCDAMP of suggesting turbidity augmentation to control nonnative fish populations between Glen Canyon Dam and the LCR. In 2007, Randle et al. (2007) provided a cost assessment of sediment augmentation for both sand (for beaches) and silt (for increased turbidity for nonnative fish control) from Navajo Canyon in Lake Powell to the mainstem Colorado River near the confluence of the Paria River. In 2010, fish experts working on the Non-Native Trout Control EA / SDM Workshop rated a "turbidity curtain" with mud and silt augmentation near Lees Ferry as the most effective long-term strategy for controlling trout below the Paria River (Runge et al., 2011). Turbidity augmentation for nonnative fish control below the Paria River was proposed (but not included) for the 2016 LTEMP EIS. In March 2018, Dr. David Ward (then with GCMRC) gave a presentation to the TWG again reiterating options for turbidity control of predators using numerous methodologies such as retention basins in the Paria delta to capture and utilize sediment. We suggest that turbidity modification for nonnative fish control be reassessed to see if the costs are now on par with the impacts to hydropower production identified in the 2024 LTEMP SEIS and if so begin a process to begin turbidity augmentation program to control smallmouth bass expansion into Grand Canyon.</p> | <p>Reclamation does not currently have a turbidity curtain or another way to augment turbidity. Reclamation is currently pursuing additional tiered projects with short-, mid-, and long-term timelines, including associated NEPA efforts.</p> |
| <p>WAPA remains concerned that this action may result in unsustainable impacts to critical infrastructure, grid stability, power prices, and the programs Reclamation and WAPA rely on to meet water and power delivery obligations. The Basin Fund and Project is not structured to offset the impacts of nonreimbursable costs of an experiment of this magnitude. The Basin Fund cannot absorb these impacts without impacting the programs it supports. If this action is implemented, WAPA and Reclamation will need to proactively work to offset impacts to the Basin Fund to maintain the stability of the CRSP system and ensure the financial viability of the Project.</p> | <p>Reclamation will work with WAPA and stakeholders to continually assess hydropower and respond to unacceptable adverse impacts.</p> |
| <p>BOR indicates that the States consultation and coordination provisions from the 2016 LETMP ROD will be unchanged, Nevada would like to ensure that happens</p> | <p>The consultation and coordination provisions will not change from the 2016 LTEMP ROD.</p> |

| Comment | Response |
|---|--|
| The ROD should include in the Environmental Commitments section the same text as is in Section 1.2 of the 2016 LTEMP ROD, which states, "In addition, Reclamation may make modifications under circumstances that may include operations that are prudent or necessary for the safety of dams, public health and safety, other emergency situations, or other unanticipated or unforeseen activities arising from actual operating experience (including, in coordination with the Basin States, actions to respond to low reservoir conditions as a result of drought in the Colorado River Basin)." | The 2016 LTEMP ROD remains unchanged unless specified by the Final ROD. Language has been added accordingly. |
| BOR should select all the flow alternatives in their ROD so that if we try one, and it proves not to work, then we have the ability to implement another option without delay. | This is described in the <i>Summary of Action</i> such that Reclamation may choose any alternatives after 2024. All alternatives are included in Table 1 for reference. |
| The ROD should include in the Environmental Commitments section the development of an effectiveness monitoring plan. | A monitoring plan has been included in the Final ROD. |
| The ROD should include in the Environmental Commitments section a renewed commitment to pursue the prevention of fish passage through the dam. Nevada recognizes this commitment was made in the 2016 LTEMP ROD but believes the progress has been too slow. | The 2016 LTEMP ROD remains unchanged unless specified by the Final ROD. Reclamation is currently pursuing additional tiered projects with short-, mid-, and long-term timelines, including associated NEPA efforts. |
| monitoring metrics need to include analysis of impacts of conducting any of these experiments and an offramp in case there is an infrastructure integrity concern | A monitoring plan has been included in the Final ROD. |
| There should be more definitive parameters for noticing temperature triggers with concerns to hydropower | Clarifying language has been added to the Final ROD regarding triggers. |
| More specific parameters are needed to understand when and if we need an offramp in order to mitigate risk to the Basin Fund | Reclamation will work with WAPA and stakeholders to continually assess hydropower and respond to unacceptable adverse impacts. |
| The Final SEIS and Draft ROD do not identify specific offramps or criteria Reclamation will use to evaluate the effectiveness of the chosen operational alternatives at disrupting smallmouth bass establishment. | The 2024 LTEMP ROD has been updated to include additional details on off-ramps. The monitoring plan was also included as an attachment. Offramps will be further refined in the planning and implementation process. |

| Comment | Response |
|--|--|
| <p>The UCRC remains concerned with the analysis of the HFE Protocol modification in this SEIS process. The UCRC continues to believe that the purpose and need and the alternatives analysis for the HFE Protocol modifications are inadequate</p> | <p>Reclamation has included additional details on the HFE protocol in the 2024 LTEMP ROD. The modification of the HFE protocols is consistent with proposed modification to the HFE protocol that was supported for inclusion in this SEIS by the AMWG in August 2023.</p> |
| <p>we continue state the importance that experimental flows should not occur if there is a risk that they will cause irreparable damage to the river outlet works. Moreover, UCRC would oppose any proposed experimental operations that use the river outlet works if such operations may negatively affect the rights afforded to the Colorado River Basin States pursuant to the Law of the River</p> | <p>Reclamation will work to minimize any adverse impacts from the experiments and will consistent with the Law of the River.</p> |

Attachment D

Comments on the Final SEIS

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ARIZONA MUNICIPAL POWER
USERS' ASSOCIATION



GRAND CANYON STATE ELECTRIC
COOPERATIVE ASSOCIATION



ARIZONA POWER
AUTHORITY



IRRIGATION & ELECTRICAL DISTRICTS'
ASSOCIATION OF ARIZONA

US Bureau of Reclamation
Attn: LTEMP SEIS Project Manager
125 South State Street, Suite 800
Salt Lake City, UT 84138
LTEMPSEIS@usbr.gov

March 15, 2024

**Re: Draft Glen Canyon Dam Long-Term Experimental and Management Plan
Supplemental Environmental Impact Statement (LTEMP SEIS) (Federal Register Notice,
Vol. 89, No. 28, February 9th, 2024)**

On behalf of Public Power interests in Arizona, the Arizona Municipal Power Users' Association (AMPUA), Arizona Power Authority (APA), Grand Canyon State Electrical Cooperative Association (GCSECA) and Irrigation and Electrical Districts Association (IEDA), submit the following comments in response to the Draft LTEMP SEIS published in the Federal Register on February 9th, 2024.

AMPUA is an association of Arizona public and consumer owned power entities including irrigation districts, electrical districts, electric cooperatives, municipally owned electric systems, Salt River Project, and Central Arizona Project. The majority of AMPUA's members have contracts for federal hydropower.

The APA is a corporate and political body of the State of Arizona. The Authority is the designated contractor for the entitlement of the State of Arizona in electric capacity and energy associated with the Hoover Dam. The Authority markets and schedules this entitlement to 63 power customers throughout the state of Arizona, consisting of tribes, cities and towns, irrigation and electrical districts, and the Central Arizona Water Conservation District.

GCSECA is a membership trade organization consisting of six Electric Distribution Cooperatives and the Arizona Generation and Transmission Cooperatives who collectively serve

approximately 450,000 rural residents across 12 counties in Arizona. GCSECA's member cooperatives are rural, not-for-profit utilities that are owned and governed by the people they serve.

IEDA represents 25 members, 15 of whom hold contracts with the Colorado River Storage Project. IEDA has been in existence since 1962, with a primary purpose of protecting the contracts of its members for federal hydropower.

Purpose and Need

As we have mentioned in the past, the "purpose" of pursuing improvements in the LTEMP should be expanded beyond only flow options to address short, mid, and long-term needs.

The rush to complete this SEIS by the Summer of 2024 (Draft SEIS-page 22) is resulting in a flawed process by strictly focusing on flow alternatives. A proper and thorough evaluation of alternative prevention methods should be included in this SEIS, not in a later NEPA process, because the issues being addressed have persisted for some time, including before the finalization of the LTEMP FEIS.

Drought has persisted in the Colorado River Basin since 2000, resulting in occurrences where water downstream of Glen Canyon Dam has reached 16°C at RM61 as early as 2005 (https://gcdamp.com/images_gcdamp_com/9/95/Temperature_bl_LCR_1990_2015.jpg).

Nonnative, warmwater fish have been detected downstream of Glen Canyon Dam for over 20 years. Green sunfish were rotenone poisoned in 2015, and biologists have recommended that the Bureau pursue prevention of fish passage from the dam since 2016. (<https://www.wired.com/story/the-fight-against-the-smallmouth-bass-invasion-of-the-grand-canyon/>)

While we support the concept of preventing establishment of smallmouth bass and other nonnative, warmwater, invasive fish (page 19), the issues being addressed existed in 2016 and should have been addressed in the LTEMP FEIS, or this SEIS should have included nonflow prevention methods (page 20) based on seven years of awareness that nonnative, invasive fish could impact humpback chub downstream of Glen Canyon Dam.

We find the representation that smallmouth bass is a *new* problem in the "Purpose and Need" section erroneous. The purported inclusion of the "latest scientific information" for HFEs was found lacking in the document. While mentioned later in the document, the absence of inclusion that warmer water potentially benefits the humpback chub is a glaring omission in the "Purpose and Need" section.

The absence of alternative prevention methods suggests a predetermined outcome. This is expressed clearly in the SEIS on page 27 ("Reclamation would like the flexibility to implement temperature-based flow options to target smallmouth bass").

Alternatives

We appreciate the inclusion of the Non-Bypass Alternative. Given the lack of justification for exclusion in the Smallmouth Bass EA and the responses from stakeholders, inclusion of this alternative was necessary.

As mentioned in the “Purpose and Need” section, the alternatives do not go far enough to address the nonnative, warmwater, invasive fish downstream of Glen Canyon Dam. These alternatives are missing nonflow options that could prevent entrainment through the dam and fails to address nonnative hotspots like the -12 Mile Slough. We question whether some of the flow alternatives will inundate the slough, as some of its elevation sits above the normal river channel. Certain areas, like the -12 Mile slough, should be permanently modified to eliminate a warm water area conducive to nonnative fish establishment. In our opinion, the proposed channel (mentioned during the Annual Reporting meeting) through the slough will fill with sediment after the first HFE. Permanent actions, like fish curtains and slough excavation, should ultimately be included in the LTEMP SEIS, in addition to the proposed flow alternatives.

We also assert that the proposed alternatives should have guardrails to ensure that these experiments are only considered when necessary. If the elevation in Lake Powell gets high enough, release temperatures through the penstocks from the hypolimnion will be cool/cold enough to prevent establishment downstream without bypass flows.

Temperature

Warm water downstream of Glen Canyon Dam is not a new phenomenon and is likely the reason for the improvements in the humpback chub population resulting in a downlisting (from endangered to threatened). This is acknowledged in the SEIS (page 176 & paragraph below) but impacts to humpback chub from cool/cold water are not discussed in this draft.

Starting in 2004, the temperature of water released through Glen Canyon Dam increased in summer and fall when lower levels in Lake Powell allowed warm surface water to be entrained in the penstocks. Warmer releases of up to 16°C were reported in late summer and fall through 2015, but the magnitude and duration of these warm water releases have varied by year. This temperature increase has enhanced the growth of Humpback Chub in Grand Canyon and allowed greater mainstem residence and possibly reproduction in western Grand Canyon (Kegerries et al. 2016; Rogowski et al. 2017). The warmer temperature may also allow for expansion of warm-water nonnative fish species. (USFW Species Status Assessment for the Humpback Chub – March 2018)

Figure 3-23 (page 109) is very telling in the life cycle of native fish. They benefit from warmer waters in the river. It appears that the nonnative trout are the ones who would benefit the most from cooler/colder water.

(<https://deeply.thenewhumanitarian.org/water/articles/2017/05/15/calls-to-rethink-the-colorado-rivers-iconic-dams-grow-louder>)

Therefore, how can cool/cold flows be prioritized when warmer water benefits the humpback chub? It should be especially concerning that the SEIS contemplates increased HFEs or flow spikes, which would transport nonnative fish into humpback chub populations downstream of Glen Canyon Dam.

HFEs

HFEs have been utilized since 1996 and could be the most efficient mechanism to build beaches. However, they may also be the biggest threat to native fish because of their transport mechanism of nonnative fish downstream (page 140). As the only currently allowed mechanism to rebuild beaches, alternatives should be developed that allow for beach building without HFEs to prevent depositing nonnative fish downstream.

Spring HFEs have been attributed to aiding trout in the past as well as building beaches over the rafting season, but they also change shorelines (page 167) that could impact backwaters and native nesting sites. They can also move nonnative, warmwater fish downstream when they are very active, as they seek to feed and renourish themselves.

We continue to have concerns with the impacts of HFEs on the system, including increased erosion/wear on the bypass tubes and the potential to utilize them in high power demand months (June-August). There are conflicting statements in the SEIS regarding non-HFE years due to warmer weather and entrainment of nonnative fish (page 19). HFEs were not held during certain years because of nonnative fish being discovered downstream of Glen Canyon Dam. If HFEs were avoided because of the rationale stated, then flow spikes (similar to HFEs) should not be included in the flow alternatives.

In addition, HFE protocols should be adhered to in the future, such that any HFE cannot be performed if they do not meet the requirements (page 18).

Economics/Hydropower

Hydropower is a primary authorized purpose of the CRSP Act, and it should be protected (page 2).

As such, analysis of the impacts to hydropower should be performed by the subject matter experts (Western Area Power Administration). The SEIS states that economic models used by Grand Canyon Research and Monitoring Center (GCMRC) are based on standard energy economic analysis methods from (Harpman) 1999 (page 75). The energy market today is drastically different than the one from 25 years ago. The historical locational marginal price used pricing from 2020 to 2023 (page 76). These years include COVID energy prices, an outlier that skews and minimizes the impacts. The modeling was also performed for one week in the month and extrapolated over the entire month (page 76). Energy prices are highly volatile and weather dependent. This extrapolation has resulted in flawed economic modeling by GCMRC. The price comparison between the GCMRC and WAPA data translates to nearly a \$30/MWh

price difference (page 82). We feel that even the highest purchase power value used (\$117/MWh) is insufficient to reflect the true cost of replacement power during the cool/cold flows. Therefore, we recommend that the modeling from GCRMC related to hydropower be removed.

Economic value, as presented in the SEIS, was confusing, inconsistent, and lacked consideration of electric grid dynamics. In reviewing the draft, the meaning of loss of economic value was not clear. What was clear was that the grid impacts due to reductions at Glen Canyon Dam were not evaluated in context of the market. Summer purchase power can exceed \$300/MWh, and scarcity pricing can skyrocket costs into the thousands per MWh.

There also seems to be a lack of understanding by those who drafted the SEIS on how the shift towards electrification is increasing demand, while supply is lagging. Resource adequacy and grid reliability are a major area of concern for FERC/NERC, but the SEIS presents a false narrative regarding new renewables eliminating the need for generation at Glen Canyon Dam (page 195). In reality, these renewables will increase the reliance on hydropower to help balance the grid.

We also find a disparate analysis of nonuse in relation to hydropower. There is an abstract reference to nonuse hydropower value (page 254) but a very descriptive comparison of nonuse values for the environment. Included later (page 261), there are very specific (if not overstated) net values of whitewater boaters and anglers but none for hydropower impacts. A true comparison between the 40+K rafters' economic value and the 4M power customers should be included in the SEIS, as should the baseline generation value that Tables 3-13 to 3-28 utilize.

Air Quality

Air quality is very specific to pollution sources, airflow, topography, and precipitation. While the utilization of the WECC 11 State grid average emissions factor of pollutants for replacement power is rational, comparing the increased pollution on a percentage basis based on this regional area minimizes the true increase in tons. A more comprehensible comparison would be to equate the increased tons of pollutants to vehicles on the road. For example, the increase of 33,750 Metric Tons of CO₂ (Table 3-60) is roughly equivalent to 6,275 gas power cars on the road.

Modeling

Modeling assumptions throughout the SEIS appear speculative or limited. Terms like "assumed..., but not confirmed" (page 102), "unproven models" (pages 151/152), "several limitations...modeling results" (pages 155 & 183), "conceptual, as opposed to predictive" (page 183), "recalibration" (page 209) and "no model exists" (page 369) call to question the information presented. Decisions based on flawed data often result in flawed decisions.

History of Glen Canyon

Construction of Glen Canyon Dam dramatically changed the flows of the Colorado River, but it is not responsible for the nonnative, invasive species that were introduced.

Tamarisk, introduced by the US Department of Agriculture, reached the Grand Canyon in the late 1920s and early 1930s. While the potential to scour these invasive trees has been severely limited because of flow limitations at Glen Canyon Dam, the dam is not responsible for the impacts to beach building that Tamarisk prevent downstream of the dam because they existed before the dam. Nor are they called out in the SEIS for the impacts to aeolian transport and how they limit cultural resource protection.

Piscivorous, nonnative fish (rainbow trout, brown trout, green sunfish, smallmouth bass, etc.) consuming humpback chub (et. al) is not caused by the dam because they did not exist prior to the 1900s. Some of these fish were introduced prior to the dam, creating a situation where native fish became part of the diet of introduced species. Responsibility for controlling nonnative fish should not fall on the hydropower customers, as the dams were not responsible for the introduction of these piscivorous, nonnative fish.

Biases

The biases expressed in the SEIS are concerning and indicative of a failed process. This is self-evident in the statement that the “Reclamation would like the flexibility to implement temperature-based flow options to target smallmouth bass” (page 27). This is further reinforced by describing the alternatives as “smallmouth bass alternatives” (page 28).

The Non-Bypass flow alternative seems targeted by mentioning its impact to shoreline stability, but the SEIS does not mention something similar with regards to HFEs (pages 157 & 166).

The inclusion of statements such as, “individuals owning property in the region around Glen Canyon Dam are considerably more likely to support continuation of dam operations” and “(t)hese people are more likely to receive the benefits of Glen Canyon Dam hydropower at their property and are, therefore, more likely to be personally affected by the economic viability of communities that receive low-cost hydropower” (Jones et al. 2016) (page 264) reflect a bias against hydropower. CRSP power is delivered over the majority of five states. Perhaps their support of hydropower is based on a comprehension of the benefits it provides, not just based on the proximity to Glen Canyon Dam.

Conclusion

This SEIS is a continuation of a flawed process first seen last year in the Smallmouth Bass EA. The lack of inclusion of nonflow alternatives, despite multiple years dealing with these issues, highlights its deficiencies.

Based on the benefits that warm water provides to the humpback chub, we feel that the benefits of cool/cold water flow alternatives are overstated, or the pros are not adequately contrasted to the cons. If the viability of the humpback chub is the main concern, alternatives that reduce HFEs and the transportation of nonnative fish downstream, instead of increasing their frequency, should be contemplated.

Hydropower generation is a primary purpose of the CRSP Act but continues to see a decline in production because of the 1995 ROD and 2016 LTEMP. The analysis performed regarding hydropower impacts is insufficient to reflect the true costs of these alternatives.

Since cool/cold water impacts could have a negative impact on humpback chub, we support the Non-Bypass alternative as the only one that will benefit the humpback chub and improve hydropower production.

If Reclamation insists on having a cool/cold water flow alternative, we must insist that it does not select either cool water alternative and that the alternative have sufficient guardrails as to Lake Powell elevations that preclude these experiments from being performed if the lake is above an elevation that might entrain nonnative fish.

Sincerely,



Russell Smoldon
AMPUA



Jordy Fuentes
APA



Dave Lock
GCSECA



Ed Gerak
IEDA

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June 28, 2024

Ms. Kathleen Callister
Adaptive Management and Water Quality Division Manager
U.S. Bureau of Reclamation

Electronically submitted to: LTEMPSEIS@usbr.gov

RE: Final Supplemental Environmental Impact Statement for the Glen Canyon Dam Long-Term Experimental and Management Plan

Dear Ms. Callister:

The Arizona Game and Fish Department (Department) appreciates the opportunity to provide input to the Bureau of Reclamation's (Reclamation) May 31, 2024 Federal Register notice regarding the Final Supplemental Environmental Impact Statement for the Glen Canyon Dam Long-Term Experimental and Management Plan (LTEMP). The Department is aware of the changing conditions below Glen Canyon Dam, the risk of establishment of warmwater non-native fish in this section of the Colorado River, and the need to adjust the LTEMP high flow experiment sediment account window. The Department continues to manage fish and wildlife resources within the Colorado River watershed and its systems.

Under Title 17 of the Arizona Revised Statutes (ARS), the Department, by and through the Arizona Game and Fish Commission, has jurisdictional authority and public trust responsibilities to conserve and protect the state fish and wildlife resources. In addition, the Department manages threatened and endangered species through authorities of Section 6 of the Endangered Species Act and the Department's 10(a)(1)(A) permit. It is the mission of the Department to conserve and protect Arizona's diverse fish and wildlife resources and manage for safe, compatible outdoor recreation opportunities for current and future generations. As a cooperating agency on the development of the SEIS, the Department appreciates the full consideration of previously submitted comments and recognizes the adjustments that have been made to date on preliminary drafts to address concerns from our agency. The Department provides the following comments on the final SEIS in addition to the previously submitted comments based on the agency's statutory authorities, public trust responsibilities, and special expertise related to wildlife resources and wildlife-related recreation as they relate to the Federal Register notice.

Flow Alternatives to Address High Risk Warmwater Non-native Fish

Higher water temperatures coming through Glen Canyon Dam and the increased risk of fish entrainment due to low reservoir elevations are the driving factors for establishment of Smallmouth Bass (SMB) and other high risk non-native fish species downstream of the dam. Although these factors are a result of the existing water conditions within the Colorado River basin, both release temperature and entrainment can be influenced and managed by operations at

azgfd.gov | 602.942.3000

5000 W. CAREFREE HIGHWAY, PHOENIX AZ 85086

GOVERNOR: KATIE HOBBS **COMMISSIONERS:** CHAIRMAN TODD G. GEILER, PRESCOTT | CLAY HERNANDEZ, TUCSON | MARSHA PETRIE SUE, SCOTTSDALE
JEFF BUCHANAN, PATAGONIA | JAMES E. GOUGHNOUR, PAYSON **DIRECTOR:** TY E. GRAY **DEPUTY DIRECTOR:** TOM P. FINLEY

Glen Canyon Dam. As a stakeholder within the Glen Canyon Dam Adaptive Management Work Group (AMWG), the Department is supportive of the implementation of flow options that disadvantage high-risk warmwater species (e.g., SMB). As such, the Department is supportive of the selection of cool mix as the preferred alternative for 2024 and encourages adoption of operations that maintain water below 16°C in future years in order to protect aquatic resources below Glen Canyon Dam. The Department appreciates Reclamation's inclusion of predicted SMB growth rates (λ) for the Alternatives within the final SEIS. Alternatives that incorporate sustained use of bypass (i.e., cool mix) to maintain release temperatures less than 16°C are more effective at reducing the probability of establishment of SMB with less uncertainty than cold spikes and alternatives without any bypass. The Department has concerns with the inclusion of the non-bypass Alternative within this SEIS. Given the predicted effects, the non-bypass alternative does not appear to reduce the SMB population growth rate compared to the No Action Alternative in years of increased release temperatures. As a result, the non-bypass alternative does not meet the need as established in Section 1.4, nor the Secretary's Designee directive from May 2022 AMWG to develop "operational alternatives that could help prevent cool- and warmwater invasive fish establishment".

Within the scoping comments, the Department encouraged Reclamation to plan for flexibility within the implementation of the action alternatives to fit within the adaptive management framework of the program. While the Department recognizes that this can be a challenge within compliance documents that are not meant to be determinative (i.e., advocate for one alternative), it is important to contain options within the Alternatives (e.g., days in which flows should be implemented, ratios of bypass to powerplant discharge, shape of hydrographs) to either be more effective in their purpose or reduce impacts to other resources. Additionally, the flow Alternatives were specifically designed for SMB and may not be as effective for other cool- and warmwater species. Having a suite of parameters within flow Alternatives that could be manipulated would allow for a more focused response to a variety of high risk non-native species, without additional compliance, and would be beneficial for adaptive management. In some cases, the Alternatives could contain more discretionary language to facilitate future improvements to the Alternative flows or needs established by the Glen Canyon Dam Adaptive Management Program.

The Department recognizes that the flow regimes outlined by the Grand Canyon Monitoring and Research Center and Reclamation to suppress SMB will disrupt recreational opportunities at Lees Ferry during high flows; however, they also represent an overall benefit to the LTEMP resource if effective in their suppression of SMB by maintaining colder water releases below the dam. The Department does appreciate the inclusion of considerations for mitigating impacts to anglers within each of the alternatives. The Department continues to recommend Reclamation consider implementing peak flows during times of lowest use (i.e. weekdays), as feasible, to minimize impacting recreational users, and to provide adequate time for public announcements for recreationalists to adjust plans and minimize impacts to boating and angling trips.

It should be recognized that although the Department agrees that the mechanisms of the flow options proposed should disadvantage warmwater species, the efficacy of such actions to elicit population-level effects on unwanted species is yet unknown. Reliance on flow operations exclusively to disadvantage warmwater species at Lees Ferry *is likely not an effective long-term*

strategy, unless paired with other preventative measures. The Department is encouraged by pursuit of technologies that Reclamation is exploring, including tailrace trawls and forebay exclusion nets and/or temperature curtains in preventing or limiting entrainment of warmwater fish through Glen Canyon Dam. These preventative actions, together with the modification of the slough by the National Park Service are critical components to work in tandem with the flow alternatives outlined in the SEIS to minimize biological and economic impacts to existing resources from high risk non-natives.

Sediment Accounting Window

The Department is supportive of the changes to the sediment accounting window proposed within the final SEIS. The Department has long advocated for adjustments to the accounting window to allow for additional spring high flow events as they fit more closely with natural processes of rivers. Further, these adjustments will address the changing precipitation conditions within the basin, which preclude current winter sediment triggers from being met. Changes to the sediment accounting window are needed to meet sediment resource goals outlined in the LTEMP and are in the spirit of the adaptive management framework.

The Department has previously expressed concerns with combining flow actions to address SMB and High Flow Experiments to address beach building by way of the sediment accounting window within the same SEIS. The Department continues to reiterate the importance that these actions should not be considered mutually exclusive because the intended purpose benefits separate resources goals. Related to this concern, implementation of each should not be influenced by the other (e.g. cost, impact to water, or hydropower resources). Additionally, while the final SEIS acknowledges “expedited communication and cooperation” will be required for implementing the 2024 preferred alternative, the Department continues to have concerns that the current decision process through the implementation process does not allow for adequate time to thoroughly discuss, deliberate, and make a recommendation on implementation for these actions together or separately. Thus, the Department continues to recommend Reclamation identify clear guidance that ensures adequate time for review and coordination of flow experiments to be considered for implementation.

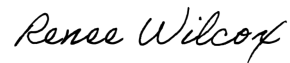
Dissolved Oxygen

The factors contributing to dissolved oxygen (DO) levels in the Colorado River below Glen Canyon Dam are complex, and are influenced by conditions in Lake Powell and dynamics below the dam. In previous comments, the Department has noted that the document mistakenly implies that DO is the exception to water quality parameters being “highly defined” by the water quality in Lake Powell, which is now contained within the introduction to water quality on 3-192. However, low DO below the Glen Canyon Dam (e.g. 5 miles) is directly correlated with DO levels at the level of the penstocks, and low DO events have been observed in this section of Lees Ferry. The replenishment of DO through photosynthetic processes only occurs during daylight hours and may not be adequate to provide refugia from significantly low DO events coming through the dam at night. It is also important to acknowledge that despite this section being a relatively small area of the Colorado River ecosystem, it also represents the most

important reach of the Rainbow Trout fishery, an LTEMP resource, to fishing guides and recreational anglers.

Thank you for the opportunity to provide input on the final SEIS for the Glen Canyon Dam Long-Term Experimental and Management Plan. For further coordination, please contact Ryan Mann at rmann@azgfd.gov or by phone call to 623-236-7538.

Sincerely,

A handwritten signature in cursive script that reads "Renee Wilcox".

Renee Wilcox
Habitat, Evaluation, and Lands Branch Chief

AGFD # M24-06061527



IRRIGATION & ELECTRICAL DISTRICTS' ASSOCIATION OF ARIZONA

US Bureau of Reclamation
Attn: LTEMP SEIS Project Manager
125 South State Street, Suite 800
Salt Lake City, UT 84138
LTEMPSEIS@usbr.gov

June 28, 2024

Re: Glen Canyon Dam Long-Term Experimental and Management Plan Final Supplemental Environmental Impact Statement (LTEMP FSEIS)

The Irrigation and Electrical Districts' Association of Arizona (IEDA) is extremely disappointed that the Bureau of Reclamation has failed to address the threat of non-native fish for so long (since at least 2016) that they are now putting forth a deficient solution. The problem is that the possible solution doesn't address the root cause, avoids the possibilities of better and more cost-effective solutions (like fish barriers above the penstocks), ignores the science of how warm water is benefiting the chub, includes mechanisms that will increase the transport of non-native piscivorous fish into humpback chub colonies, and completely shirks its responsibility to balance the impacts of hydropower.

Smallmouth Bass was identified in the *Expanded Non-Native Aquatic Species Management Plan in Glen Canyon National Recreation Area and Grand Canyon National Park Below Glen Canyon Dam – Environmental Assessment* (National Park Service - September 2018) as existing in both the Glen Canyon National Recreation Area (GCNRA) and Grand Canyon National Park (GCNP), with a threat level of “very high.” As a Cooperating Agency for this EA, the Bureau should be participating in the annual, threat-level review. Given the ongoing monitoring of non-native species in GCNRA and GCNP, the rushed processes undertaken in the Smallmouth Bass EA and LTEMP SEIS have shown a lack of the diligence expected from the Bureau.

While physical barriers are referenced in the non-native aquatic species EA (2018), concepts like fish curtains are listed as a long-term initiative in *Invasive Fish Species Below Glen Canyon Dam: A Strategic Plan to Prevent, Detect and Respond* (Smallmouth Bass Ad Hoc Group - 2023), even though preventing fish passage through Glen Canyon Dam is listed as the top priority of this report. Over four years have transpired between these two documents, time that should have been spent developing a more thorough analysis of the “long-term” solutions identified in 2018. This includes the mitigation of the RM-12 slough that was identified as a hotspot for green sunfish in 2015. This would have allowed a preferred alternative that could have included fish exclusionary devices that are more feasible and cost-effective. The

2023 report is full of references to barriers, but they are conspicuously absent from the FSEIS despite the multiple requests submitted in response to the LTEMP SEIS.

The non-native aquatic species EA (2018) includes localized water heating to disadvantage the trout. Yet, in all of the documents referenced in this letter, protection of the blue-ribbon rainbow trout fishery is prioritized. This focus on the trout fishery helps explain why the cool mix alternative was prioritized. Despite humpback chub benefiting from warmer water, the cool water releases will benefit the non-native, cold-water, piscivorous trout that consumes native fish.

Non-native fish control is the responsibility of the National Park Service (NPS), but because flow-based controls are outside their EA, this shifts the costs and responsibility of non-native fish control off of NPS and onto the power customers. Tribal representatives, like the Zuni, have expressed support for fish curtains (to avoid the taking of life).

Despite the claim that fish curtains are long-term solutions that will be administered under a separate NEPA process, the length of time that the Bureau was aware of non-native fish passage through GCD and their establishment downstream, preventing fish passage should have been the top priority for protection of humpback chub downstream.

Much like in previous years, HFEs should be ceased until the rampant increase in non-native fish occurring downstream of GCD can be brought under control and the RM-12 slough is mitigated. By increasing the sediment window in the LTEMP FSEIS for HFEs (despite an absence of justification), the frequency and duration of HFEs will increase the risk of Smallmouth Bass to the humpback chub (and other native fish) because of conveying them downstream into their habitats.

The LTEMP FSEIS was deficient in including inaptly named “long-term” solutions to ensure that adjusting water temperature was the only possible solution to this situation. The commitment to pursue “additional tiered projects with short-, mid-and long-term timelines, including associated NEPA efforts” is insufficient to mitigate immediate hydropower impacts. (FSEIS A-60.) Therefore, IEDA requests that the Bureau of Reclamation delay the Record of Decision, rescind and revise the FSEIS to include physical barriers and allow for more feasible and cost-effective solutions that don’t fall on the backs of the power customers.

*IEDA represents 25 members, 15 of whom hold contracts with the Colorado River Storage Project. IEDA has been in existence since 1962, with a primary purpose of protecting the contracts of its members for federal hydropower. **The Public Power Interest in Arizona letter (dated March 15, 2024) that we previously submitted is attached for reference.***

Sincerely,



Ed Gerak
IEDA

June 30, 2024

Bureau of Reclamation
Attn: LTEMP SEIS Project Manager
125 South State Street, Suite 800
Salt Lake City, UT 84138

Via Email only – LTEMPSEIS@usbr.gov

RE: GLEN CANYON DAM LONG-TERM EXPERIMENTAL AND MANAGEMENT PLAN (LTEMP) FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (FSEIS)

Summary:

On behalf of Utah Associated Municipal Power Systems (“UAMPS”) and the 50 municipally and community owned electric utilities that we represent, we thank the U.S. Bureau of Reclamation (“BOR”) for the opportunity to serve as a cooperating agency for the Glen Canyon Dam Long-term Experimental and Management Plan Final Environmental Impact Statement (“LTEMP FSEIS” or “FSEIS”). In 2016, UAMPS served as a cooperating agency for BOR’s Final Environmental Impact Statement for the Glen Canyon Dam Long-Term Experimental and Management Plan, and we hope to participate meaningfully in the process, including by providing these comments on the LTEMP FEIS. UAMPS incorporates by reference comments it submitted concerning the Draft Supplemental EIS regarding the following items: (1) UAMPS’ Comment on LTEMP FSEIS Need, Purpose and Scope; (2) UAMPS’ Comment on LTEMP DSEIS Timing; (3) UAMPS’ Comment on Directed Removal of Smallmouth Bass; (4) UAMPS Comment on Alternatives; (5) UAMPS’ Comment on Flows to Hydropower and Energy Costs; and (6) UAMPS’ Comment on Reliability.¹

UAMPS also provides additional comment on the three following items addressed in the FEIS: (1) Additional smallmouth bass information; (2) ESA Section 7 Consultation; and (3) Cost to the Basin Fund. These additional items are addressed below. UAMPS also seeks clarification and alignment on several items that UAMPS raised regarding the LTEMP DSEIS. In the aggregate UAMPS believes that if the preferred alternative is pursued that BOR should strongly consider permitting CRSP contract customers to be part of the the planning and implementation group of stakeholders.

¹ See UAMPS Comments re: DSEIS (March 25, 2024)

UAMPS' Interest in the LTEMP FSEIS:

UAMPS is an interlocal agency and political subdivision of the State of Utah formed to provide comprehensive wholesale electric energy services, on a not-for-profit basis, to community-owned power systems throughout the Intermountain West. UAMPS membership consists of 50 municipally and other community-owned electric utilities located in seven western states. Thirty-seven UAMPS members are located in Utah. Most UAMPS members own and operate a local electric utility system that provides integrated retail electric service to residential, commercial, and industrial customers. UAMPS partners with its members to ensure that electricity is affordable and reliable.

UAMPS currently manages 16 separate projects that provide power supply, transmission, and other energy services to participating members. One of these projects is the Colorado River Storage Project, named after the Colorado River Storage Project ("CRSP") authorized by the 1956 Colorado River Storage Project Act, which provides power generated by the Glen Canyon Dam ("GCD"). UAMPS serves as a single purchasing agent for our 34 members that have a firm allocation of CRSP capacity and energy. In the aggregate, CRSP provides 642,994 MWh of contract power to 228,253 end use customers. Additionally, UAMPS and its members regularly purchase power off the grid and are therefore sensitive to market and regulatory forces that impact electricity affordability and reliability.

Flows from GCD that do not generate power affect UAMPS members in three very concrete ways: (1) They receive less power, which they must replace; (2) the replacement power usually nearly always costs more than power from CRSP, especially when the need for additional power is unpredictable or at peak times; and (3) long-term impacts to the Basin Fund will ultimately place budgetary pressure on the operation and maintenance needed and other power-related expenses. Increased costs are passed on to customers at a time when many Americans are already struggling financially.

UAMPS Comment on Additional Smallmouth Bass Data:

UAMPS appreciates that BOR referred to the Center for Colorado River Studies report in the FSEIS. However, UAMPS strongly disagrees with the extent to which the report's findings were overlooked in the FSEIS. UAMPS believes that BOR overlooked the main finding of this study altogether that points to the FSEIS' preferred alternative as providing only a short-term solution to the smallmouth bass problem.² While BOR may not be able to impact turbidity, the finding in this study also seems to indicate that the impact of temperature on SMB population growth is not everything and only a short-term solution. In particular, the report states, "The cool mix option, which requires more frequent use of jet tubes to cool water temperatures and reduce entrainment, is likely the most effective action to limit smallmouth bass abundance in Glen Canyon in the short term [...] The likelihood of smallmouth bass persisting in the Glen Canyon Dam tailwater and Glen Canyon during the next 20 years is high, even with the short-term measures (e.g., mechanical removal and designer flows) proposed in the next 3 years to prevent

² FSEIS at p. 1-11 (May 2024).

smallmouth bass expansion."³ The findings of this study should have been evaluated and considered more seriously than they were by BOR.

UAMPS Comment on Section 7 Consultation:

UAMPS is disappointed that BOR paid such little attention to ESA Section 7 consultation and the potential impact of the preferred alternative on threatened species like the humpback chub. Especially when the point of this FSEIS is to protect threatened native species. Specifically, UAMPS disagrees with BOR when it said “Reclamation determined the effects of the Cool Mix Alternative on threatened and endangered species fall within the parameters analyzed in the 2016 LTEMP Biological Opinion (the “2016 BO”) and do not likely require additional consultation.”⁴ In reviewing the 2016 BO cited by BOR, it says, that “[i]n summary, LTEMP would have both *negative* and *positive* effects to humpback chub and their habitat. The stranding of young chub could occur during HFEs, TMFs, and downramp rates, but longer-term beneficial impacts to older age classes may result from actions taken to reduce nonnative predators.”⁵ At a minimum, the findings of the 2016 BO underscore the fact that the results of HFEs could be detrimental to humpback chub and merit further review. In a memorandum from U.S. Fish and Wildlife Service (“FWS”) to BOR, staff at FWS specifically referred to this very page number of the 2016 BO from which the above quote is found – Page 47.⁶ It is concerning that BOR and FWS did not provide additional information on the Section 7 Consultation section of the FSEIS and UAMPS feels that this analysis merits further review.

Cost to the Basin Fund:

UAMPS is concerned with the financial impact of additional flows contemplated in the preferred alternatives to the Basin Fund. Estimates indicate that the cost of these additional flows could cost between \$13.5 - \$26.9 M and approximately \$200 M in a worst-case scenario.⁷ BOR also highlights that “at the maximum economic impact level, many projects and programs that are currently supported by the Basin Fund may have to be deferred or reduced.”⁸ While UAMPS recognizes that the Basin Fund does not have a direct impact on BOR, depleting the Basin Fund does have long-term impact on UAMPS members if other funding sources are not identified. UAMPS is concerned that in the event of needed operations and maintenance that the Basin Fund will lack sufficient funds to do the needed work. Further, is BOR prepared to request appropriations support from Congress if mitigating funds are needed? In light of the growing budget deficit and national debt, federal discretionary spending will be more challenging than it already is and in the event of an emergency, a depleted Basin Fund could pose a serious risk to UAMPS members.

³ Center for Colorado River Studies Report on Smallmouth Bass at p. 5 (April 11, 2024).

⁴ FSEIS at p. 4-3 (May 2024)

⁵ Biological Opinion 2016 LTEMP ROD at p. E-47 (emphasis added)

⁶ Whitlaw, Heather and FWS Memorandum re: Response to Request for Agreement that Effects to Threatened and Endangered Species for Flow Options Covered in LTEMP Biological Opinion, at p. 2 (May 31, 2024).

⁷ FEIS at 3-41 (May 2024).

⁸ *Id.*

Conclusion:

UAMPS values the longstanding working relationship that we have with BOR, WAPA, NPS and other federal agencies with jurisdiction over areas of the Colorado River System. While we continue to believe that the preferred alternative in this FSEIS will have significant impacts to UAMPS members that BOR overlooks, we look forward to working together to resolve our concerns with the LTEMP FSEIS as we collectively care for and manage such a valuable resource.

Sincerely,

A handwritten signature in black ink, appearing to read "Mike Squires".

Mike Squires, Esq.
Managing Director of Government Affairs
Utah Associated Municipal Power Systems



MAICH KUCATE
Governor

Cordelia Hooec
Lt. Governor

Anthony Sanchez, Jr.
Head Councilman

Virginia Chavez
Councilwoman

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Bricia Sanchez
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Shirley Bellson
Councilman

Ricky R. Penketewa, Sr.
Councilman

Edward Wemytewa
Councilman

Officially known as the Zuni Tribe of the Zuni Indian Reservation

26 June 2024

Kathleen Callister
LTEMP SEIS Project Manager
Bureau of Reclamation
Upper Colorado Region
125 South State Street, Suite 8100
Salt Lake City, UT 84138

RE: Zuni Comments on the Bureau of Reclamation's (BOR) *Glen Canyon Dam Long-Term Experimental and Management Plan: Final Supplemental Environmental Impact Statement (SEIS)*

Dear Ms. Kathleen Callister:

This letter is a statement of *A:shiwi*, the Pueblo of Zuni ("Zuni"; "Zuni Tribe"), a federally recognized, sovereign, self-determined, and self-governing Native American Tribe. This letter is Zuni's formal response to and comment on the Bureau of Reclamation's (BOR) *Glen Canyon Dam Long-Term Experimental and Management Plan: Final Supplemental Environmental Impact Statement (SEIS)*. The Zuni Tribe has identified at least two major, overarching, and interrelated flaws with the SEIS that have resulted in incomplete and/or incorrect conclusions and findings. These flaws and incorrect conclusions overwhelmingly prove that the Bureau of Reclamation has failed to fully and meaningfully comply with the National Environmental Policy Act and the National Historic Preservation Act.

- The first major flaw is that the SEIS fails to fulfill the requirements of 40 Code of Federal Regulations (CFR) 1500.1(b) and 40 CFR 1502.24. These guiding rules respectively mandate that decisions are required to be made using "high quality" information and "professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements." High quality information and professional and scientific integrity require attention to and couplings with imperatives for compliance outlined at 40 CFR 1502.6 "Interdisciplinary preparation" (*emphasis added*), which clearly states:

Environmental impact statements shall be prepared using an inter-disciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts (section 102(2)(A) of the Act). *The disciplines of the preparers shall be appropriate to the scope and issues identified in the scoping process (§ 1501.7).*

The SEIS fails to include preparers with the appropriate disciplining (Zuni traditional knowledge holders) who are appropriate to the scope and scoping issues identified by the Zuni Tribe. Further, it appears the Zuni Tribe must again bring to the attention of BOR a recent memorandum from the Executive Office of the President, Office of Science and Technology Policy (OSTP) and the

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Council on Environmental Quality (CEQ), which states that Indigenous Knowledge (IK) is “an aspect of best available science” which can more “accurately capture the impact[s] ... on culturally or ecologically significant land[s]” (Prabhakar and Mallory 2022:19). This memorandum further acknowledges that:

Since Indigenous Knowledge is often unique and specific to a Tribe or Indigenous People, and may exist in a variety of forms, *Agencies often lack the expertise to appropriately consider and apply Indigenous Knowledge. As a result, consultation and collaboration with Tribal Nations and Indigenous Peoples is critical to ensuring that Indigenous Knowledge is considered and applied in a manner that respects Tribal sovereignty and achieves mutually beneficial outcomes for Tribal and Indigenous communities [emphasis added; Prabhakar and Mallory 2022:2].*

In attempting to partially extract Zuni IK and present it in the SEIS with no qualified or competent personnel to provide analyses, the SEIS works to directly undermine Zuni knowledge and political sovereignty.

Rather than provide a “hard look” at direct, indirect, and cumulative environmental impacts, including to the *A:shiwí* human environment, as stipulated at 40 CFR 1508.14, and historic and cultural resources, as stipulated at 40 CFR 1502.16(g), the SEIS presents uncritical, abstract, and evasive findings in Section 3.13.1 “Affected Environment” with the statement that “This [SEIS] document cannot adequately convey the deep ties that each Tribe, individually, has to the Canyons and Colorado River. Words are insufficient to express that connection.” The Zuni Tribe holds the expertise to convey *A:shiwí* deep ties—and the direct, indirect, and cumulative impacts that are occurring and will continue to occur to them—in both the Zuni and English language. The ongoing dismissiveness of Zuni offers for inclusive collaboration and *A:shiwí* insights and concerns in the Glen and Grand Canyons is a matter of environmental *injustice* that the SEIS and its preparers regenerate and perpetuate, and that the current SEIS's environmental justice analysis wholly fails to consider.

As BOR is well aware, the lands, airs, and waters of Glen and Grand Canyons are not only culturally and ecologically significant, but sacred to and for *A:shiwí* and other Native American Tribes, and the SEIS findings are little more than busy paperwork that fail to base conceptual and methodological practices and associated findings and conclusions in accessible aspects of best available science. These IK aspects of best available science are necessary to fulfill the very purpose of National Environmental Policy Act (NEPA) in general and this SEIS process in particular.

These failures are emphasized by the claim in Section 3.13.2 “Environmental Consequences” that “No impacts on water deliveries or Indian trust assets are anticipated.” If, as the preparers of the SEIS clearly state, they are incapable of “convey[ing] the deep ties that each Tribe, individually, has to the Canyons and Colorado River,” then they are also incapable of presenting a competent claim that there are no anticipated impacts to *A:shiwí* and other Indian trust assets. This finding and conclusion could only be achieved by failing to fulfill responsibilities stipulated at 40 CFR 1500.1(b), 40 CFR 1502.24, and 40 CFR 1502.6, and making unentitled “white possessive”

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(Moreton-Robinson 2015) claims that violate scientific principles and fail to uphold professional and scientific integrity.

- The second overarching and interconnected major flaw of the SEIS identified by Zuni is that BOR and its cooperating federal agencies present an insufficient definition of “Indian trust assets” (ITAs), and premise findings and conclusions based on its faulty foundations. According to the SEIS, ITAs are “Legal interests in assets held in trust by the federal government for federally recognized Indian Tribes or individual Indians,” but this definition provides no further discussion or consideration situating it within the full spectrum of what Indian trust assets—and associated agency responsibilities—are or may be. The Zuni deep time heritage, religious, and cultural associations to Grand, Glen Canyons and the Colorado River are documented in the Zuni emergence and migration histories; histories and associated traditional cultural properties that have been shared with the Bureau of Reclamation for over twenty years.

The Advisory Council on Historic Preservation (ACHP) recently reconfirmed that federal agency trust responsibilities may extend to and “encompasses all aspects of historic resources, including associated Indigenous Knowledge and other intangible values” (ACHP 2024:3), and, as noted above, the SEIS fails to consider direct, indirect, and cumulative impacts to the *A:shivi* human environment, as stipulated at 40 CFR 1508.14, and *A:shivi* historic and cultural resources, as stipulated at 40 CFR 1502.16(g), including the Zuni Chaco Heritage Historic District and natural resources—including water—that serve as cultural resources.

The conclusion in Section 3.13.1 “Affected Environment” that “No effects on Indian trust assets were identified from the proposed alternatives; therefore, these are not considered further” fails to account for the fact that no qualified or competent personnel needed to account for Zuni insights and concerns were asked to participate or otherwise collaboratively involved in the preparation of the SEIS. Further, a number of inaccuracies, deflections, and failures to account for the full requirements of NEPA and SEIS preparation, as outlined in this letter, are entangled in the claim in Section 3.12 “Cultural Resources” that:

The LTEMP programmatic agreement (PA) was executed in September 2017 (Reclamation 2017) as the means of resolving any adverse effects of LTEMP actions through the stipulations therein. In addition, Reclamation is developing a MOA under the LTEMP PA regarding nonnative fish control and flow actions under Glen Canyon Dam's operations that would replace the existing MOAs.

The Zuni Tribe reminds BOR and its cooperating agencies that while coordination and substitution processes exist for National Historic Preservation Act (NHPA) and Section 106 review (see 36 CFR 800.8 *et seq.* and CEQ and ACHP 2013), neither process relieves BOR of its responsibilities under NEPA. In this context, it is vital that BOR and cooperating agencies recognize that NEPA is much broader than NHPA insofar that assessments of and considerations for impacts or effects to historic/cultural/heritage properties and resources—such as culturally important places, land/waterscapes, historic districts, and any contributing resources and elements—are not limited to those eligible or potentially eligible for listing in the National Register of Historic Places (NRHP).

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Any recourse to the 2017 PA or development of a memorandum of agreement (MOA) is insufficient to account for *A:shiwí* insights, concerns, human environment relationships, and associated impacts to the traditional cultural practices, IK, and health and wellbeing of the Zuni Tribe and Zuni people required as part of NEPA analyses.

The Zuni Tribe reminds BOR that it and other cooperating federal agencies hold affirmative trust responsibilities as well as regulatory obligations to steward, manage, and care for extant *A:shiwí* resources and sacred sites in ways that avoid destruction and deterioration to all aspects of their integrity including those that convey traditional and associative significance. The Zuni Tribe is deeply concerned not only that BOR and its cooperating agencies continue to be negligent in fulfilling their affirmative land and water stewardship responsibilities and SEIS analysis obligations, but with the seeming lack of attention, care, and concern of the direct, indirect, and aggregating harm to the health and wellbeing of the Zuni community. These are environmental justice concerns which BOR and its cooperating agencies have been made fully aware, but which are wholly absent in the SEIS analysis, findings, and conclusions.

Zuni is committed to reasonable, meaningful, and good faith consultation and in fulfilling all of the rights and opportunities afforded under all applicable laws, regulations, agreements, and associated guidance for honoring our stewardship responsibilities for the ancestral lands, airs, waters, heritage resources, and sacred sites that help comprise *A:shiwí A:wán Dehwa:we*, the Zuni ancestral and traditional cultural land/waterscape, including the Zuni Chaco Heritage Historic District and Glen and Grand Canyons. It is vital to continue Government-to-Government consultation to discuss and reconcile these matters. Zuni reminds BOR and its cooperating agencies that as a federally recognized, sovereign, self-determined, and self-governing Indian Tribe, the Zuni Tribe is a rights holder. If you have any questions or need additional information, please do not hesitate to contact me at 505.782.7022 and Zuni Tribal Councilman Edward Wemytewa at 505.782.7021.

Sincerely,



Arden Kucate
Governor