

Glen Canyon Dam Adaptive Management Program Adaptive Management Work Group Meeting Webinar May 15, 2024

Wednesday, May 15, 2024

Start Time: 9:03 AM Mountain Standard Time (MST)

Conducting: Wayne Pullan, Bureau of Reclamation, Acting Secretary's Designee to the Adaptive Management Work Group (AMWG) and AMWG Chair

Designated Federal Officer: Daniel Picard, Bureau of Reclamation

Recorder: Beccie Mendenhall, SeaJay Environmental LLC.

Facilitator: Terra Alpaugh, Kearns & West Inc.

Welcome and Administrative

- **Opening Remarks**

Wayne Pullan, Acting Secretary's Designee to the Adaptive Management Work Group:

Welcome to everyone, I want to introduce Annalise Blum, Deputy Assistant Secretary for Water and Science and Christina Kalavritinos, Senior Advisor to the Assistant Secretary for Water and Science. Before I begin, we are honored to have a few words from Deputy Assistant Secretary Blum.

Annalise Blum, Deputy Assistant Secretary for Water and Science: I am grateful to have a few moments to address this important federal advisory committee. As a reminder, this program was developed to provide an organization and process for stakeholders to advise the department on the Glen Canyon Dam operations with regards to downstream resource protection and management to improve the values for which the Glen Canyon National Recreation Area and the Grand Canyon National Park were established. Since the last AMWG meeting in February there has been an extraordinary effort to develop a draft workplan and budget that will direct the research and monitoring over the next three years. Given the ongoing efforts to establish short-term and long-term Colorado River operations and possible efforts to assess the use of Glen Canyon Dam operations to address the Smallmouth Bass issue, getting the right work plan in place is important now more than ever. The department continues to look to each of you for your technical expertise, personal and professional experience, traditional knowledge and your collective capacity for problem solving. Thank you for your dedication and hard work. I look forward to working with all of you as we navigate through these challenging times.

Wayne Pullan (Designee): It has been a little over two months since our last AMWG meeting. During that time there has been a tremendous amount of work done on the GCDAMP Triennial Work Plan (TWP). As you are aware, because of pressing issues we pushed this effort forward one year. Thank you to Erik Skie, the BAHG [budget ad hoc group] group chair, for his rigor in running numerous ad hoc group meetings to get us to this point. I would also like to thank the GCMRC staff who worked tirelessly to develop proposals and answer questions from stakeholders over the last few months. Finally, I want to thank all of you who reviewed drafts, provided input and helped develop the workplan to this point. Your input in this process is why our effort works so well.

In addition to the TWP, I think it is important to take a moment and reflect on our process with the LTEMP SEIS. This is the NEPA process under which we are considering actions to end or avoid infestation by non-native fish downstream of Glen Canyon Dam. This has also been an extraordinary effort. I want to acknowledge the work of so many people in this room who helped develop, review and comment on the drafts in a compressed and aggressive timeline. This has not been easy and has required the best of us technically, professionally, and personally as we tackle these very difficult issues. It is wonderful to say we are now very close to the finish line. In addition to the LTEMP SEIS, it is worth noting that the near-term Colorado River Operations Record of Decision was signed last week. That gives Reclamation the tools to operate those facilities should we face difficult hydrology. We are also deeply into the post-2026 EIS. I want to thank everyone who has provided input into these two processes.

I want to address the recent media attention directed toward the Glen Canyon Dam infrastructure. We discussed this at the February AMWG meeting, but I wanted to reiterate a few points. As you know, Glen Canyon Dam was designed for power production. There are Penstock intakes at 3490 feet which run through the turbines. Then 100 feet lower are the intakes for river outlet works which bypass the turbines. As part of the high-flow experiments, we bump up flows beyond what goes through the turbines using the river outlet works. Over the past year we have gained experience operating at lower reservoir elevations which has provided additional information about the river outlet works under these conditions. Reclamation engineers have identified two areas of concern for the river outlet works. The first is adverse effects to the pipes via cavitation. Low pressure bubbles develop in the pipes and then collapse, releasing energy which causes the cavitation damage. The second concern is with sediment scour directly downstream of the turbines which is exacerbated when there is low water elevation. In response to these concerns, Reclamation has developed interim operating guidance for releases through the river outlet works at lower reservoir elevations. The guidance minimizes the potential for cavitation damage while ensuring the ability of the river outlet works to meet the project purposes and allow alteration of flows as part of GCDAMP program. We will continue to update that operational guidance as we learn more. The important thing to note, with respect to LTEMP SEIS, we anticipate the flows that we will need for those purposes are well within the range of the revised operational guidance.

The primary purpose of the meeting today is to provide updates on the FY 2025 to FY 2027 Triennial Work Plan with a goal to have a consensus recommendation at the August AMWG meeting. In addition, we will get an update from our tribal liaison, hear the latest hydrology and temperature projections, and have a status update on actions related to the non-native fish strategic plan. We have arranged a discussion on the LTEMP SEIS as well.

Before we continue further, let me say how much I and the Department appreciate your participation and focus on the process and proceedings today. I think you all know my belief in this process. Advising the Secretary on the protection of the Grand Canyon, a valuable resource to the nation, is important and honorable work. There is power in compromise, recognizing the interests of others and working towards consensus. I am confident in the capabilities of this special advisory committee and look forward to working with you on all our continuing challenges. Finally, speaking candidly, I am looking forward to our August meeting held on the south rim of the Grand Canyon. This is an opportunity to connect directly with our mission.

There will also be a tribal workshop the day before to share their insights and perspectives on the Grand Canyon at the edge of the Grand Canyon. I encourage everyone to attend.

- **Introductions and Determination of Quorum (13 members)**: A quorum was reached.
- **Review February Meeting Evaluation: Terra Alpaugh (Kearns & West Inc)** We had 10 respondents, largely positive about the presentations and agenda. Thank you to those who provided response to the TWP.
- **Administrative Updates: Bill Stewart (BOR)**
 - o AMWG Charter: It was signed in Sept 2023, it is good for two years, available on our website. This will need to be renewed in Sept 2025.
 - o AMWG Membership Status: There are several new alternates that have been approved since our last meeting as well as a Hualapai nomination that is in process. There are several members with terms that are expiring in January of 2025. We anticipate we will have a federal register notice in June, after which we will reach out to the expiring members to determine interest in continuing with the program. There are a few TWG membership nominations in process as well. These should be complete in the next month.
 - o Action Item Tracking Report: We have three active action items we have been tracking.
 - 1) Monitoring Metrics: There was a guidance memo request to develop monitoring metrics to track and report progress on LTEMP. Reclamation and USGS met in early May to discuss a path forward on the monitoring metrics. Two metrics need further work, hydropower and tribal. We will be reaching out to partners in the coming months with a goal to finalize these metrics by the February 2025 AMWG meeting. We will provide an update in August.
 - 2) TWP and Budget: This stemmed from the current work plan where there was uncertainty in funding levels and prioritization of projects. This has been incorporated into efforts on the new TWP. We anticipate this action item will close with approval of the plan in August.
 - 3) Five Area Actions identified at the Aug 2022 AMWG:
 - a) Evaluation of HFE during Low Elevations / Low Flow - Completed
 - b) Evaluation of downstream resources during Low Elevations / Low Flow –continues to 2026
 - c) Drafting of non-native strategic plan - Completed Feb 2023
 - d) NEPA compliance for operational flexibility to address non-native fish – will be completed with final LTEMP SEIS.
 - e) Evaluate exclusion and temperature control options – planned deep dive in July 2024.
 - o August AMWG Logistics: Reminder AMWG Aug 21-22, Tribal workshop to start around 1 pm on Aug 20. There are still rooms available at the Red Feather lodge, please reach out to Tara Ashby for assistance.

GCDAMP Tribal Liaison Update:

Jamescita Peshlakai, GCDAMP Tribal Liaison We have been doing a lot of work with the tribes recently. We finished the annual programmatic agreement meeting April 8-9. The annual report was sent May 3, the tribes have 30 days to provide comment. LTEMP SEIS cooperating agency letters were sent, and we are working on the TWP. The letters are new in 2023, an invitation from the Secretary inviting the tribes to be cooperating agencies in the LTEMP SEIS. We have received returns from Hopi, Navajo, Zuni, and Hualapai tribes with Southern Paiute Consortium and Havasupai still pending. There are 5 internship

awards in process with Conservations Legacy Ancestral Lands. Interns will be placed somewhere within the GCDAMP programs. Now I will turn it over to tribal representatives for river monitoring trip reports.

Jakob Maase (Hopi Tribe) The river trip was wonderful, no major issues to report, most resources seemed healthy. I will compile notes and present during the February meeting. The salt mine seemed to have less recovery than anticipated, the tribes are discussing what they want to do with that.

Erik Stanfield (Navajo Nation) There are a few things we look at as indicators of ecosystem health.

1) Counts of big horn sheep: We counted 46, a moderate number but about half of these were lambs, including several sets of twins. Indicates populations are healthy and thriving.

2) Salt mine regeneration: It wasn't as good as 2023 but better than 2022. Interesting to see how precipitation levels have an impact on that. Looking at ways to measure this more systematically.

3) Archeological sites: There is a site near mile marker 202 that has some Navajo affiliated pictographs we want to investigate. We are proposing to do some digital processing with the park service to see if we can enhance the imagery and better understand the pictures. Last point, we are paying close attention to the TWP budget process. We hope to have good tribal engagement in this process as it plays out in the next weeks.

Jamescita Peshlakai One last item to share, the tribes just wrapped up a trip to Washington, DC where they received a national award. Zachary Nelson will be providing a report on that award at the August AMWG meeting.

GCDAMP Triennial Budget and Work Plan Development Process:

Seth Shanahan (State of Nevada) and TWG Chair First thank you to everyone involved. This process is rigorous, takes a lot of time. People have been engaged and dedicated, working toward consensus in a cooperative and collaborative way. We tried a few new things in the process. One is a digital survey instrument. Two is pushing the June TWG meeting into July to allow more time for processing the TWP and receiving input from the science advisory board.

Erik Skeie (State of Colorado) and BAHG Chair I want to tell the story between the Feb AMWG meeting and today. The TWP survey requested answers to two questions for each project:

- How necessary is this project to accomplish LTEMP Goals?
- How well is this project funded to accomplish its intended goals?

Every TWG member responded, and these responses were incorporated into the budget work. Looking at the timeline of events, you can see many new processes were added since February. There has been heavy lifting for the GCMRC staff to rework project budgets based on TWG feedback. We sent the second draft for review and feedback after the April BAHG working meetings. We only received 10 responses for the second BAHG survey, disappointing after 100% response on the first survey. We are open to recommendations for another method to get input. There are still several drafts and reviews to be completed, culminating in the Recommendation at the August AMWG meeting.

Overview of Draft FY25-27 Triennial Budget and Work Plan:

Bill Stewart (BOR) Discussions at the BAHG meetings are largely around the GCMRC projects. A lot of the work on the Reclamation side of the budget is related to tribal projects. The total TWP budget is \$12.5M, up from \$11.36M in the previous work plan. This total budget is split 80%/20% between GCMRC and Reclamation. That leaves \$2.5M for Reclamation to use across five projects. There is a current surplus in the budget of \$150K - \$200K per year. We are discussing additional projects to utilize these funds with the tribes. Budget highlights by project follows.

Project 1 – AMWG: Reduced funding in this TWP, largely due to less AMWG member travel expense

Project 2 – TWG: Added option for meeting facilitation

Project 3 – Program Management: Added Program Evaluation funds to prepare for the comprehensive review post 2027 as required in the LTEMP ROD.

Project 4 – ESA compliance: Added funding for an integrated stakeholder river trip in 2025 and a smaller TWG river trip in 2026. More diligence in using the Science Advisor funds, new funding for experimental vegetation treatments, and added a project for Hydropower monitoring (formerly Project N under GCMRC) with a workshop proposed workshop in 2026.

Project 5 – NHPA Compliance (Cultural Resources): We added funding for Public Outreach to enhance communication to the tribes. Several tribal projects still ongoing from the previous work plan were continued here with zero budget to facilitate tracking. Additional funding is provided for cultural sensitivity training, NHPA Section 106 compliance and river monitoring as well as a few new tribal projects.

Andrew Schultz (GCMRC) My first slide shows a list of the Resource Goals for the LTEMP as well as a list of Resource Areas to be Evaluated. As we walk through the projects, we will tie the work back to these resource areas and goals. Reference the blue box on each project slide that will list specific resources addressed. Comparing the previous TWP to current, budget allocation is very similar across the projects. We are not finished yet with this work, what we are presenting is the latest revision but is provisional until the revisions are complete. Note that details of project elements that end up without funding will still be included in the plan as reference. Reference the slides for details on each Project A – N. The goal for this iteration of the budget was to be within 10% of the anticipated funding level, which is \$30M. Where we ended here is \$33.5M, so we are getting very close. There will be more tweaking, including the science advisor feedback. The next iteration after this should get us to the \$30M goal.

Q&A and Discussion:

David Brown (GCRG) Not sure if I misheard, did you say if an element or project did not have funding it would still be completed anyway?

Andrew Schultz (GCMRC) There is a lot of science in this plan and as we move forward some of it gets cut. We keep these elements in the work plan to include how work is done, why it is important, and the details needed to implement. As funding becomes available, we can then execute on these elements.

David Brown That confirms what I heard is correct, there is an expectation that funding will be procured elsewhere. I would benefit from more context around unfunded elements, concerns from the scientist if not funded, percent of probability for securing outside funding, impact if they are not funded and go undone.

Andrew Schultz Your point is very valid, what kind of impact does this have on the science and what are the possibilities for other funding.

Matt Rice (American Rivers) David partially asked my question. It looked like some elements were being increased, some cut. Can you go into more detail on the cuts and impact? Where does that leave holes or gaps in LTEMP goals?

Andrew Schultz I would love to share that now, but I don't believe we are ready to identify what is unfunded. We have more rework and negotiation to do. What I can say is some of these elements will be listed as unfunded.

David Brown Then what is the ask of us today? I am uncomfortable approving something without those details. Maybe this is just a preview?

Andrew Schultz Yes, it is a preview of the current iteration.

David Brown My position is I cannot approve the plan without knowing that information.

Andrew Schultz You will have that information in the final draft.

David Brown Is there an opportunity for dialogue after that?

Andrew Schultz All of the science is in this plan, in the original draft nothing was unfunded. As we trim the budget, we start to identify unfunded elements. We continue to evolve it each iteration with feedback from the program.

Bill Stewart (BOR) Erik shared the timeline. The next step is Draft 2, which will be reviewed by the Science Advisors. Then there is a further draft for TWG review and consensus at the July TWG meeting. The TWG consensus draft will then be sent to AMWG members for review prior to the August meeting. We would also be happy to host a webinar for further review.

Andrew Schultz Also, feel free to reach out to me at any time.

Kelly Burke (GCWC) Looking back at the previous TWP and implementation, it seems there is always a need for additional effort on the part of GCMRC. We would like to propose that you look back at the pattern in the past three years, estimate budget impact experienced and include it as a category or line item in the new budget. **Andrew Schultz (GCMRC)** Obviously we have tried to incorporate everything with up to date knowledge. **Bill Stewart (BOR)** On the Reclamation side of the budget, the \$350K experimental management fund operates like a contingency fund which we can allocate for GCMRC.

Kelly Burke We were hoping that could be evaluated separately so we could see it as a line item in the budget rather than being absorbed into the overall number. See what unexpected costs arose and how they were covered. Also, longer term planning isn't explicitly spelled out in the budget. I can envision a crisis with many non-native fish. **Andrew Schultz** We have a review coming up of our program. We are an adaptive program. That requires periodic analysis and synthesis of what we have learned. I think it is important we have knowledge assessments on a regular basis. I believe Reclamation set some funding side for that. **Bill Stewart** Yes, Project 3 has money set aside for knowledge assessments and program evaluation. **Kelly Burke** I would love to follow up with you more on the details. We support the knowledge assessment piece.

Charlie Ferrantelli (State of Wyoming) How certain are we on the anticipated \$30M FY25-27 and when will we know for sure what that number is? **Bill Stewart (BOR)** We are only certain once congress passes a budget each year. We make the requests three years in advance, and these are the amounts that are being requested, but we don't know for sure what will get passed until congress approves it.

Shana Rapoport (State of California) California would like to echo the request for assuring there is room for adaptability and flexibility in the budget, both within the current TWP and as we develop future TWP.

Basin Hydrology and Operations:

Heather Patno (BOR) We are in spring runoff, reservoirs are increasing in storage, total system is at 44% of capacity. Precipitation is below average for most of the basin although the forecast is still projecting normal or slightly above normal. Colorado Snow Water Equivalent (SWE) peaked in April at 113%, but inflow to Lake Powell was only 78%. There is some disconnect between the snowpack and inflow into Lake Powell. This is similar to what happened in 2015, where things cooled off in the spring run off period. The difference is there was significant precipitation in 2015 which is not in the forecast this year. Based on this information, all water forecasts decreased since the last report. For water years 2024 and 2025 upper basin operations remain the same at mid-elevation release tiers. Reference slides for details. Operations for Glen Canyon Dam are back to normal maintenance in May. Transformer replacements are finished. Maintenance for the bypass tubes is under discussion. There is also a need to reduce water levels for diving activity related to annual maintenance but that is not yet scheduled.

Bryce Mihalevich (BOR) Water temperatures in the forebay are a little bit warmer than the last two years in the upper layers, DO looks similar to past normal measures. Glen Canyon Dam release temperatures are also measuring slightly higher, with DO and specific conductance trending normal. Release temperature projections for the remainder of the year are slightly higher than last month's report. Temperature projections for river mile 61 climb above 15.5°C in late July or August 2024.

Q&A and Discussion:

Jim Strogon (TU) In regard to the diving activity and reduced water levels, you discussed being able to modify that based on temperature and DO impacts to the fish. **Heather Patno (BOR)** We will monitor and consider that, although we have to complete the work.

LTEMP SEIS Update:

Kathleen Callister (BOR) Reclamation has three NEPA actions going on:

- 1) Near Term Colorado River Operations (Interim Guidelines SEIS)
- 2) Glen Canyon Dam Long Term Experimental and Management Plan (LTEMP SEIS)
- 3) Long Term Colorado River Operations (post 2026)

The difference between these is that the LTEMP SEIS is focusing on the timing of the hourly, daily and monthly releases from the Glen Canyon Dam where the other two actions are focusing on annual releases. There are also different durations for the three actions. Reference the slides for a list of the LTEMP SEIS milestones of note as well as a review of the purpose and need for this action. The alternatives considered and analyzed in this SEIS included No Action (operations continue as defined in 2016 LTEMP ROD), four different cool/cold-water alternatives and a non-bypass alternative. Note that an HFE protocol update is common to all alternatives. We expect the final SEIS in a few weeks. This will start the required 30-day public comment period. We are looking at early July to move forward with a Record of Decision (ROD).

Q&A and Discussion:

Kurt Dongoske (Pueblo of Zuni) Zuni provided scoping comments on the development of the LTEMP SEIS. It appears these comments were not considered or addressed in the public draft SEIS. Zuni provided substantial critical comments on the quality of the public draft of the LTEMP SEIS and its failure to appropriately consider Zuni scoping comments and the unique relationship that Zuni have to this sacred place. To date, there has been no response from Reclamation to these comments and there has been no communication to Zuni on how to substantially improve the final SEIS. How should Zuni interpret this silence? **Bill Stewart (BOR)** We received the scoping comments from Zuni, and we incorporated into the SEIS. A formal response is required for all comments received. Details on how they responded to each comment will be in this published comment response. **Kurt Dongoske** One wonders how the agency incorporates the Zuni comments when I cannot see how it was actually incorporated. The contractors hired to complete the draft took the Zuni comment, printed it verbatim and offered no integration. The litmus test for compliance is in the documents that the agency produces. And that is still not evident. If the contractors that put this together reached out to Zuni for additional information or context it would have been very helpful. **Kathleen Callister (BOR)** We will take that feedback and have internal conversation about how to address it.

Leslie James (CREDA) Please clarify the 30-day period. I have heard it described as both a waiting period and as a public review. **Kathleen Callister (BOR)** It is a 30-day waiting period, but the public will have an opportunity to submit comments. How the agency responds to those comments is not covered in the NEPA agreement. We will attempt, however, to incorporate them in the ROD. **Jim Strogon (TU)** How many public comments were received for the draft SEIS? **Kathleen Callister** We received just over 60 letters with about 700 individual comments. As I mentioned earlier, NEPA regulations require that we prepare a response to every comment. That will be provided as an appendix in the final SEIS.

Ali Effati (State of New Mexico) It is our understanding that the Cool Mix alternative was selected as the preferred alternative. Is there anything you can share about that? **Kathleen Callister (BOR)** The

preliminary SEIS was released to the cooperating agencies for review. We are considering the Cool Mix for implementation in 2024 and possibly in future years. We are also considering other options. One of the things we are looking at is what would be the triggers for taking action and what would be off ramps. We are working on how to integrate that into the final ROD.

Nonnative Strategic Plan Action updates:

Small Mouth Bass Monitoring: Drew Eppehimer (GCMRC) In monitoring activity from 2003 through 2021 a total of 22 SMB were caught, with the majority in Lees Ferry. Looking at the upper stretch of river from GCD to the Paria River, there were zero SMB in 2021 and before. Then in 2022, 368 SMB were captured in this area, 90 of them were found in normal monitoring, the remainder with emergency response monitoring that was added. Looking at 2023, 1273 SMB were captured, with a few fish as far down as RM 16, beyond the Paria River. We are early in monitoring for 2024 but fish caught to date have been primarily between GCD and the slough at RM 12. SMB population dynamics are closely tied to temperature. In 2022, the GCD release temperatures went above 16°C for extended periods and starting in July rather than September. It was a similar pattern in 2023, and the first spawned fish was measured in early July. The forecast is for lower temperatures in 2024, remaining below the 16°C threshold in the main river. The slough, however, is warmer than the river, already reaching the spawning threshold at the end of April. The growth of individual SMB fish is also tightly coupled with water temperature, growing faster in warmer waters. Temperatures have reduced each year since 2022, which means smaller fish when winter starts, which means greater mortality. The 2024 science plan will continue to sample SMB and other high-risk nonnative fish in the Colorado River from GC Dam (RM -15.7) to Badger Rapid (RM 7.5). This work will attempt to answer a host of questions related to SMB in order to better understand the population dynamics. Reference the slides for details on questions and measurements planned. This is an NPS led effort, with Glen Canyon staff monitoring from GCD to Lees Ferry and Grand Canyon staff from Paria Beach to Badger Rapid (PBR). There is also routine interagency monitoring from AZGFD, USGS, USFWS. The end goal of all this research and monitoring is to determine the effectiveness of removals and potential flow experiments on the SMB population.

Q&A and Discussion:

Sara Price (State of Nevada) I feel like there is maybe some progress, we are getting more organized in how to track and analyze the program. You found presence of SMB in the slough; I am curious why no action yet? Second question are you also looking at their spawning beds and opportunities to disrupt that activity.

Drew Eppehimer (GCMRC) Fish have not been captured in the slough yet this year. I am part of USGS which is not involved with slough management. I would have to defer to NPS for updates on that. On the second question, finding spawning beds is difficult due to the low population density. But there are some pilot projects based on other indicators trying to identify spawning locations and suggest action. There is also some work being done with artificial spawning beds. **Sara Price** Is there someone else that can address the slough? **Terra Alpaugh (Kearns and West)**

There will be a presentation on that after we are done with questions for Drew.

Jim Strogon (TU) Given projected growth, when do you predict spawning capability of fish that were introduced to the river in 2022 and 2023? **Drew Eppehimer (GCMRC)** From the literature, 200mm length is the size at which fish become reproductive. Typically, this size is usually age three fish, but growth rate impacts this age. **Jim Strogon (TU)** Artificial spawning beds that you mention. What does that mean and how will they be utilized? **Drew Eppehimer** We purchased artificial spawning beds as well as made a few homemade versions. These will be placed in “hot spots” in the Lees Ferry region. Every week these will

be checked to see if there are adult SMB or eggs / larvae on the nests which indicates spawning is happening. They are small and there are only 8 beds, so we will see if this is an effective tool. Again, we are doing this because finding natural spawning beds is difficult. **Rod Buchanan (TU)** Will there be any outreach to river users to leave the beds alone? **Drew Eppheimer** Good point, coordination is important, thank you for bringing that up.

Leslie James (CREDA) Based on the slough temperature chart for April that was shown earlier, wouldn't you expect to see spawning already in the slough? **Drew Eppheimer (GCMRC)** The data I presented went through April 30, so just hitting the 16°C threshold in the slough. I would expect by now we are within spawning range but as of yet no captures of age zero fish in Lees Ferry.

Slough Modifications: Michelle Kerns (NPS) We have been meeting regularly with multiple agencies to define the project to channelize the slough. Based on input from this interdisciplinary team, Reclamation has a final design proposal that creates a channel from the river through the upper slough and partially filling the lower slough to increase the water velocity. There is high confidence from fishery experts that this will prevent non-native breeding, which is our goal for this location. NPS has determined that an Environmental Assessment (EA) is the likely compliance pathway for action. It is the park service intention to move quickly, so we have identified internal funds to support this action while waiting for Reclamation funding to be approved. We have initiated Section 106 process with tribal contact, informal discussions and a letter sent April 25th. We intend to conduct civic engagement, expect details on that soon. Reclamation identified a funding source and NPS has issued a notice of support to them on April 30th. The timeline will be dependent on availability of resources and funding to conduct this work.

Q&A and Discussion:

Julie Carter (AZGFD) What is the likely timing of the EA independent of the funding request to Reclamation? **Michelle Kerns (NPS)** The EA request went to our regional director yesterday, hoping for reply by end of week. Our desire is to have this EA complete by October. **Christina Noftsker (State of New Mexico)** If all goes well with the EA, when would the work start? **Michelle Kerns** Fall or winter, prior to the 2025 summer season.

Shana Rapoport (State of California) With the mention of potential spawning now, what are we doing to take action? **Drew Eppheimer (GCMRC)** Let me clarify, temperatures are in range for spawning, but nothing has been detected. **Shana Rapoport** Are there no detections because we are not out there? Or because there is nothing detected yet? **Michelle Kerns (NPS)** We are out there multiple times per week. **Charles Yackulic (GCMRC)** These fish require some physiological changes before spawning. So, while the temperature is right, there is still some time delay before spawning starts. **Michelle Kerns** The intention is for a full week of electrofishing the week of May 27th. There will be a high presence in this location. **Jim Strogon (TU)** Is there a plan to put in a barrier in at the slough? **Michelle Kerns** Yes, I believe that is happening soon. **Jeff Arnold (NPS)** We are waiting on a part for the block net. It is supposed to arrive this week.

Ali Effati (State of New Mexico) Our assumption is that there will be opportunities to provide public comments as part of this upcoming EA, is that correct? **Michelle Kerns (NPS)** Yes, that is part of the process. **Leslie James (CREDA)** Will the EA be associated with or tier off the existing NPS Non-Native Control EA? **Michelle Kerns** No, this will be a stand-alone action.

Technical Work Group Chair Report:

Seth Shanahan (State of Nevada), Technical Work Group Chair Since the last AMWG in February we had one meeting with the next meeting planned for July. Many topics from the April TWG are also items reported here in the AMWG agenda including Basin hydrology and operations, PA, TWP and Budget, LTEMP SEIS, and Non-Native Fish actions. At the April meeting we put a lot of time into the agenda for TWP and Non-Native Fish and we could have actually used more. We are trying to create spaces for that. One of the ways to do that is through our Ad Hoc Groups (AHG) which add opportunity for TWG members to share information and ideas outside the standard meetings. We have four active groups, the last two of them relatively new.

- 1) Budget AHG (Chair: Erik Skeie) – This is the group actively working on the TWP and budget
- 2) Steering Committee AHG (Chair: Seth Shanahan) –Steers the topics, reports, activities for TWG
- 3) Socioeconomic AHG (Chair: Ben Reeder) – Last November this group was charged with developing a proposal for managing Project N which resulted in moving that project from GCMRC to Reclamation. With that goal met, TWG is now asking this group to focus on models and concepts that might help the LTEMP goals for hydropower, recreation, and cultural resources. Initial focus will be on hydropower modeling.
- 4) Small Mouth Bass AHG (Chair: Emily Young) – This group was relaunched at the April TWG and is charged with evaluating warmwater non-native fish actions to assess effectiveness and recommend updates to the Strategic Plan. Meetings start the week of June 3rd with the first focus to be review of the “Smallmouth Bass Management Review Committee” report.

One topic from the April TWG which is not covered in the AMWG agenda was a Hydropower Review provided by Jerry Wilhite from WAPA. This had very useful information about hydropower resources and historical data, including annual power generation from GCD since 1984. Interesting to note the steady decrease over time with some of the lowest years on record occurring in the last five years. There was also a presentation on Rainbow Trout fishery status by Brian Healy, with concerns reported from the public of potential collapse of that fishery. He outlined some near-term actions including reduced monitoring trips to help reduce impact to these fish while adding more analysis on the decline. Most of the activity for the July TWG will be focused on finalizing the TWP recommendation for AMWG. In addition, there will be AHG reports and status updates on non-native fish and rainbow trout.

I want to share one item not from TWG but relevant. I had an opportunity to visit the Glen Canyon Tailrace Sediment Modeling. This is a 1:32 scale model of the dam and river. You can also see a full scale model of the river outlet works illustrating the pressure differentials in the curve that are responsible for cavitation. I highly recommend a visit if you have an opportunity.

Federal Agency Updates (2-3 minutes each):

USGS - Mark Anderson We have nothing else to add.

USFWS - Jess Newton The Humpback Chub Recovery Team met in person last week, working on revising the HBC recovery plan last done in 2002. The end result will be a published recovery implementation strategy. We are also engaged in the post-2026 NEPA process, submitted joint comments with NPS. Priority metrics on operational strategies were delivered to BOR. We provided comments on the preliminary SEIS, acknowledged uncertainties, and noted that without implementation of the proposed action in 2024, we risk not being able to take effective action. This delay could render future actions as minimally effective. Next Tuesday is our May river trip, which includes translocation of HBC, and will be executed in coordination with USGS scientists for joint monitoring work.

BOR - Bill Stewart We provided an update at the February AMWG about Fish exclusion via thermal curtain. We continue to work on this effort and will provide an update again at the August AMWG.

NPS - Michelle Kerns Grand Canyon update: The trans-canyon waterline from Havasu to Phantom Ranch is under way. Excavation is happening at Phantom Ranch for the water treatment plant. Also beginning construction of a water treatment plant on the south rim.

Glen Canyon update: We are partnering with Canyonlands National Park to initiate a planning process for the Cataract Canyon portion of the river. Public meetings will begin for this planning process in July in Moab. We are now the 10th most visited park in NPS with the largest spike in visitors at the Lees Ferry district. Half day trips will again be operating out of Lees Ferry through our concession partner. The NPS Office of Submerged Resources conducted a maintenance dive at Lees Ferry on the Spencer Steamboat, placing stabilization chains on this under water cultural resource. Due to changes in the reservoir, we currently have four design projects underway to support recreational access and visitor services on the lake. These efforts are supported by our disaster supplemental appropriations from FY 2022 and FY 2023. We are also working with partners to restore services of the ferry between Bullfrog and Halls Crossing.

BIA - No one present

WAPA - Brian Sadler No updates today

DOI Solicitor - Rodney Smith We have been in LTEMP litigation since fall of 2019. We have prevailed in the district court in Arizona and the 9th circuit court. Why do we care? Because this means the LTEMP stays in place as is. Shout outs to those who have intervened to provide briefings in this case.

Stakeholder Updates (2-3 minutes each):

Pueblo of Zuni - Edward Wemytewa First I want to underscore Kurt's message regarding Zuni comments on SEIS. Second, I want to share about attending the award presentation last week in Washington DC. I feel that attending the award ceremony with all tribes represented gave us a better understanding of where we as tribes stand in respect to the work being done by GCDAMP. I just want to say we are on board as a Zuni tribe, appreciate the research that is happening and the bonding of the partnerships that are happening. We are in a good position. I want to call on Jakob for comment.

Hopi Tribe - Jakob Maase I have no further comment except to thank Reclamation and this program for nominating us for this award.

State of Nevada - Sara Price A small group of us in the lower basin did a field trip. We got to see some of the growth in the Palo Verde area. It has been awhile since we had a field trip, so to see the progress was helpful. It is important to see the relationship between the lower basin program and the GCDAMP. I want to give a shout out to the scientists that are working collaboratively in this effort.

State of California - Shana Rapoport California, along with the other lower basin states, submitted a draft alternative to Reclamation in March for the post-2026 Colorado River operations. The alternative was developed through months of meetings and modeling to dial in the releases and reductions that will keep the system functioning under a variety of hydrological conditions. We are still working to refine the proposal and aspects of the alternative and are looking forward to Reclamation's SEIS at end of the year.

State of Colorado - Michelle Garrison Adding to Betsy's update, Colorado. We have about 50 SCPP projects, have also conducted ASO data acquisitions, and will be installing both USGS and CO DWR stream gages utilizing BLM funding.

State of Arizona - Kristin Johnson Arizona Department of Water Resources has brought a full-time tribal liaison on board. Donovan Carr joined the Department on Monday, coming over from the Governor's Office. He will work with the Director to interface with Arizona's 22 tribes.

State of Utah - Betsy Morgan This year, Utah has 31 System Conservation Pilot Program (SCPP) projects and staff are in the field this week conducting the first verification effort for the year. Over the past winter, we've initiated Utah's first Airborne Snow Observatories Pilot Project in the Uinta Basin that includes one snow-off flight and three snow-on flights for three years. We're excited to use this new data

to improve our understanding of snowpack and runoff forecasting in Utah. Finally, we've leveraged Bipartisan Infrastructure Law funding through the Upper Colorado River Commission for the installation of 10 USGS stream gages within the Colorado River Basin in Utah. This funding will support the operation of these new gages plus two existing gages on the Colorado and Green River for 5 years.

AZGFD - Ryan Mann Our Flagstaff research office is preparing for our second trip of the season. We will be on the river for two weeks, hoping for less turbid conditions. I want to highlight Seth's report on concerns about the rainbow trout fishery. We remain engaged with the anglers on their concern and are working with partners on seeking management options that reduce impacts to this resource.

American Rivers - Matt Rice American Rivers and several of our conservation partners submitted a Conservation Coalition Alternative for post-2026 operations. We also continue to work with BOR on deployment and implementation of Inflation Reduction Act dollars to build resilience in the Colorado River basin.

CREDA - Leslie James We are going into the summer months which are extremely challenging for utilities who are tasked to manage power resources in the southwest. Dynamic power demands coupled with the carbon transition is creating extreme challenges. We all need to remember about the person at the end of the line that needs electricity to survive.

GCWC - Kelly Burke Our Paria Beach riparian restoration project and outdoor education riparian restoration classroom is continuing this year with a Hydro Flask Parks for All grant. Youth and river guide volunteers did additional pole planting and site maintenance on March 31. The survival of planted cottonwood and goodding's willow trees is above 80%. Native shrubs seeded in previous years have successfully reestablished across the upper terrace. Thank you to our many partners and volunteers in this project including GLCA and GCNP, Page High School, and U.S.G.S./Helen Fairley.

GCRG - David Brown We had a successful Guides Training Seminar and appreciate Superintendent Keable's attendance.

Public Comment:

Lynn Hamilton (GCRG) I have a comment in regard to the TWP budget. I noticed that Project B Sandbar and Sediment Storage Monitoring research project is not maintaining its previous level of funding. I just wanted to express how important I feel it is to ensure that the sediment monitoring budget is consistently supported within this program. Sediment is key for the health of multiple resources in the Grand Canyon and absent any HFE, that sediment continues to dwindle and erode. If you do not have a complete grasp on the sediment, you will not have the full picture on which to base the decisions for this program and to meet the mandates of the Grand Canyon Protection Act. I hope this feedback can be factored into your TWP discussions between now and August.

John Dillon (GCROA) The recreational visitors and the 16 commercial river outfitters are also grateful. 2024 is strong as we head into the peak season with 4 commercial trips a day launching from Lees Ferry and 37 trips on the water between Lees Ferry and Diamond Creek every day for the rest of the summer.

AMWG Next Steps:

Wayne Pullan (Designee) Our next meeting is August 21-22 at the Grand Canyon. We are planning additional voluntary events the day before, please work with Tara to sign up. I am impressed by the quality of presentations and work presented here today. We are moving ahead on so many fronts. August will be here before we know it. We will be looking forward to finishing the LTEMP SEIS. By August we will know whether and when to apply the tools provided in that SEIS. We will have significant work completed on the TWP and we hope to be prepared for a consensus recommendation on that plan. Between now and August we will have further activities to assess impacts for SMB and non-native fish.

We will likely be in the middle of an EA process with the park service. We hope we also have the opportunity to seek “bucket two” Inflation Reduction Act funding for the Colorado River for water conservation and ecosystem restoration associated with drought. We have a good deal ahead of us, thanks in advance to everyone who will be moving this forward and thank you to all for your service.

Meeting adjourned at 1:59 Mountain Standard Time (MST)

Participants

AMWG Members, Alternates, and Leadership

Ali Effati (State of New Mexico)	Kelly Burke (GCWC)
Amy Haas (State of Utah)	Kevin Garlick (UMPA)
Betsy Morgan (State of Utah)	Kristin Johnson (State of Arizona)
Brian Sadler, WAPA	Kurt Dongoske (Pueblo of Zuni)
Charlie Ferrantelli (State of Wyoming)	Leslie James (CREDA)
Christina Noftsker (State of New Mexico)	Matt Rice (American Rivers)
Cliff Barrett (UMPA)	Michelle Garrison (State of Colorado)
Daniel Bulletts (Southern Paiute Consortium)	Michelle Kerns (NPS)
Daniel Picard (Reclamation)	Sara Price (State of Nevada)
Edward Wemytewa (Pueblo of Zuni)	Shana Rapoport (State of California)
Erik Stanfield (Navajo Nation)	Shane Capron (WAPA)
Heather Whitlaw (USFWS)	Sheri Farag (CREDA)
Jess Newton (USFWS)	Sinjin Eberle (American Rivers)
Jim Stroger (FFI/TU)	Stewart Koyiyumptewa (Hopi Tribe)
Julie Carter (AZGFD)	Warren Turkett (State of Nevada)
Kathy Callister (BOR)	Wayne Pullan (Acting Secretary's Designee, BOR)

Other GCDAMP Members and Interested Persons

Alyx Richards (UCRC Commission)	Erik Skeie (CWCB)
Annalise Blum (DOI - ASWS)	Hannah Chambless (NPS-GRCA)
Beccie Mendenhall (SeaJay Environmental)	Heidie Grigg (NPS)
Bill Persons (FFI/TU)	Jakob Maase (Hopi Tribe)
Brandon Loomis (Arizona Republic)	Jasmyne Gramza (State of Arizona)
Bud Fazio (NPS-GLCA)	Jeff Arnold (NPS)
Cassandra Reed (NPS)	Jen Pelz (Grand Canyon Trust)
Christina Kalavritinos (DOI - ASWS)	Jeremy Hammen (BOR)
Conor Clancy NPS-GLCA	John Dillon (GCROA)
Craig Dengel (WAPA)	John Jordan (FFI/TU)
Craig Ellsworth (WAPA)	Kevin Bulletts (Southern Paiute Consortium)
Dan Leavitt (USFWS)	Andrew Schultz (GCMRG)
Dani Greene (State of Nevada)	Bryce Mihalevich (BOR)
Dave Worthington (Grand Canyon Conservancy)	Charles Yackulic (GCMRG)
David Braun (Sound Science)	David Dean (GCMRG)
David Brown (GCRG)	Drew Eppehimer (GCMRG)
David Ward (USFWS)	Emily Palmquist (GCMRG)
David Wegner	Gerard Salter (GCMRG)
Deb Williams (USFWS)	Joel Sankey (GCMRG)
Deborah Shirley	Alex Pivarnik (BOR)
Emily Omana Smith (NPS-GRCA)	Alex Walker (BOR)
Emily Young (State of Arizona)	Becki Bryant (BOR)

Bill Stewart (BOR)
Brian Hines (BOR)
Heather Patno (BOR)
Jamescita Peshlakai (BOR)
Jill Nagode (BOR)
Katrina Grantz (BOR)
Kim Dibble (GCMRG)
Kurt Shollenberger (NPS)
Nick Williams (BOR)
Tara Ashby (BOR)
Tom Ashley (BOR)
Zachary Nelson (BOR)
Lauren Tango (GCMRG)
Maria Dzul (GCMRG)
Margaret DiGiorno (BOR)
Matt O'Neill (BOR)
Matthew Alinsod (BOR)
Melynda Roberts (BOR)
Mark Anderson (GCMRG)
Paul Grams (GCMRG)
Ted Kennedy (GCMRG)

Lisa Kim (BIA)
Tom Gushue (GCMRG)
Lisa Meyer (WAPA)
Lynn Hamilton (GCRG)
Marc Wicke (Salt River Project)
Mary Plumb
Maya Clifford
Melissa Trammell (NPS)
Rob Billerbeck (NPS-GLCA)
Rod Buchanan (FFI/TU)
Rodney Bailey (WAPA)
Rodney Smith (DOI - Solicitor)
Ron Griffiths (GCMRC)
Ryan Mann (AZGFD)
Seth Shanahan (State of Nevada)
Simone Griffin (Blue Ribbon Coalition)
Tara Blake (NPS)
Ted Rampton (CREDA)
Terra Alpaugh (Kearns and West)
Tony Davis
William Allstetter (freelance journalist)

Acronyms

ACHP - Advisory Council on Historic Preservation
ADWR – Arizona Department of Water Resources
AHAHG – Administrative History Ad Hoc Group
AHG - Ad Hoc Group
AMWG – Adaptive Management Work Group
AZGFD – Arizona Game and Fish Department
BAHG – Budget Ad Hoc Group
BIA – Bureau of Indian Affairs
BO - Biological Opinion
BOR – Bureau of Reclamation
C° – degrees Celsius
CFS – Cubic Feet per Second
CRBC – Colorado River Board of California
CRCNV – Colorado River Commission of Nevada
CREDA – Colorado River Energy Distributors Association
CRSP – Colorado River Storage Project
CWCB – Colorado Water Conservation Board
D.O. – dissolved oxygen

DOI – Department of the Interior
DROA – Drought Response Operations Agreement
DSA - Deliverable Sales Amount
DWR – Department of Water Resources
EA – environmental assessment
EIS – environmental impact statement
FFI – Fly Fishers International
FLAHG – Flow Ad Hoc Group
FY – Fiscal Year
GCD - Glen Canyon Dam
GCDAMP – Glen Canyon Dam Adaptive Management Program
GCMRC – Grand Canyon Monitoring & Research Center
GCPA – Grand Canyon Protection Act
GCRG – Grand Canyon River Guides
GCROA - Grand Canyon River Outfitters Association
GCWC—Grand Canyon Wildlands Council

HFE – High Flow Experiment
LCR - Little Colorado River
LTEMP – Long-Term Experimental and Management Plan
mm – millimeter
MOU – Memorandum of Understanding
NEPA – National Environmental Policy Act
NMISC – NM Interstate Stream Commission
NPS – National Park Service
NPS-GLCA – NPS Glen Canyon National Recreation Area
NPS-GRCA – NPS Grand Canyon National Recreation Area
P&I Team – Planning and Implementation Team
PDT – Pacific Daylight Time
Reclamation – Bureau of Reclamation
RM - River Mile
ROD - Record of Decision
SEAHG – Socioeconomic Ad Hoc Group
SEIS – supplemental environmental impact statement

SHPO - State Historic Preservation Office
SMB – smallmouth bass
SNARRC – Southwestern Native Aquatic Resources and Recovery Center
SNWA – Southern Nevada Water Authority
SWE - Snow Water Equivalent
TRGD – Trout Recruitment and Growth Dynamics
TU – Trout Unlimited
TWG – GCDAMP Technical Work Group
TWP - Triennial Work Plan
UCRC – Upper Colorado River Commission
UMPA – Utah Municipal Power Agency
USFWS – United States Fish & Wildlife
USGS – United States Geological Survey
USU – Utah State University
WAPA – Western Area Power Administration
WY - Water Year
YoY – Young-of-Year