

# Glen Canyon Dam Adaptive Management Program

## Technical Work Group Meeting

### June 14 – 15, 2023

#### Day 1: Wednesday, June 14, 2023

**Start Time:** 9:50 AM Pacific Daylight Time (PDT)

**Conducting:** Seth Shanahan, Southern Nevada Water Authority (SNWA) and Technical Work Group (TWG) Chair and Kathy Callister, Bureau of Reclamation (Reclamation), Designated Federal Official

**Meeting Recorder:** Beccie Mendenhall, SeaJay Environmental LLC

#### Welcome and Administrative

- **Introductions and Determination of Quorum:** Quorum was reached.
- **Adoption of Prior Meeting Minutes:** April 2023 meeting minutes adopted with minor revisions.
- **Next Meeting Date(s):** October 11-12, 2023, in-person location TBD.
- **Ad Hoc Group Membership and Updates:** Contact Craig if anyone is interested in understanding how to update the Administrative History Ad Hoc Group (AHAHG) Wiki.
- **Update on Monitoring and Research Trips to Occur From Today Until Next Meeting:**  
[Andrew Schultz, GCMRC] Shared list of all river trips remaining in 2023. Launch dates can change slightly – if you are interested in one, please reach out to him directly. [Craig Ellsworth, WAPA] Can you provide an update on smallmouth bass (SMB) and trips that have come off the river recently? [Andrew] The Trout Recruitment and Growth Dynamics (TRGD) trip was out recently; the SMB findings will be presented tomorrow.
- **Bureau of Reclamation Staffing Update:** [Bill Stewart, Reclamation] Clarence Fullard has taken a new position. This is the last TWG mtg for him in this role. He will become Water Quality Head. Jeremy Hammen will be replacing Clarence. Kerri Pedersen is transitioning to San Juan program, Matt O’Neil and Brian Hines will be onboarding soon. [Andrew Schultz, GCMRC] Adds the following staffing updates from GCMRC: GCMRC Deputy Chief, Data Manager position, and a backfill for David Ward’s position will be hired soon.  
**Tour of Glen Canyon:** [Seth Shanahan, SNWA] Thanks to Bud Fazio, National Park Service (NPS) and the Glenn Canyon Conservancy for this tour. Reviewed logistics (see page 3 of the agenda).

#### TWG Chairperson and Vice-Chairperson Election

[Bill Davis, Fly Fishing International/Trout Unlimited (FFI/TU)] Motion made to accept the appointment of Seth Shanahan. [Sinjin Eberle, American Rivers] Seconded. [Eric Stanfield, Navajo Nation] Motion made to accept the appointment of Michelle Garrison (State of Colorado Water Conservation Board [CWCB]). [Colleen Cunningham, State of New Mexico Interstate Stream Commission (NMISC)] Seconded. [Seth Shanahan, Southern Nevada Water Authority] Both motions passed by consensus. [Clarence Fullard, Reclamation] Seth and Michelle were each elected to continue their positions in FY2024.

#### Update on Hydrology, Glen Canyon Dam Operations, and Water Quality Conditions in Lake Powell and Below Glen Canyon Dam (Presentations)

[Rick Clayton, Reclamation] All upper basins are near full, but Lake Powell is still only 37% full. Key message is that there has only been one good year of precipitation; multiple years are needed to recover and fill the system. Reference slides for details on 2023 precipitation, snow runoff forecasts, and inflow to

each reservoir. Lake Powell inflow this year is more than any in the last 12 years, and more than double half of those years. June 24-Month Study will be published June 15. These slides precede that, so slightly outdated. Lake Powell and Lake Mead will balance at the end of this water year. Water released from Glen Canyon Dam was almost doubled from prior years starting in April 2023. Lake Powell Elevation two-year forecast shows above minimum power pool and increasing through 2024. Lake Mead forecast is slightly higher than last year but still in shortage levels.

**[Robert Radtke, Reclamation]** The June data reporting will be out June 15 so these results are from May. Lake Powell release temperatures coming out of Glen Canyon Dam are all < 16 degrees Celsius (°C). Colorado River temperatures in Grand Canyons are all measuring around 16°C. Depth temperatures up to the surface are as expected (at 12 – 14°C).

### **Discussion Followed**

**[Ben Reeder, Grand Canyon River Guides (GCRG)]** Why does the June flow release graph show a sharp return (spike) at the bottom of the curve as opposed to the plateau at high of flow curve illustrating sustained flow? **[Rick]** It is to maximize production during high power usage periods, hence the plateau on the high.

**[Leslie James, Colorado River Energy Distributors Association (CREDA)]** The actual temperatures seem higher than the model. **[Robert]** It does show that in this chart, but trying to get the model to track exactly is not feasible. **[Charles Yackulic, GCMRC]** Actuals differ in both directions from forecast. It is more difficult when the in-flows are not known. Expect more information on that to come.

**[Bill Davis, FFI/TU]** Seems like August is too late for this report. Actions need to be happening sooner to prevent impact. **[Charles]** Expectation is there will be a low D.O. plume issue, where it hits is less clear. D.O. is harder than temperature to measure and model, sediments even harder. **[Seth Shanahan, SNWA]** Tracking this is important. Is it on the radar at Reclamation? **[Clarence Fullard, Reclamation]** Yes, but no easy solutions to the problem. What has been proposed is extremely challenging. **[Ryan Mann, AZGFD]** No easy solution without impacting power or storage. Bypass is an easy solution to improve D.O. but not under consideration.

### **Impacts to Hydropower Customers and the Basin Fund from Conducting Experiments (Presentation)**

**[Craig Ellsworth, WAPA]** The Colorado River Storage Project (CRSP) covers the upper basin, the lower basin is a separate project. The 1956 CRSP Act framed the structure for funding and managing the CRSP. It authorized the establishment of the Basin Fund which allows power proceeds to fund the maintenance and operation of the project. It is intended to be a self-funding / self-sustaining project. The Basin Fund supports both the Reclamation and WAPA. The federal government provides hydropower as a service to help power underserved and remote areas of the country. Long-term hydropower contracts are provided to Tribes, government facilities, and municipalities. If additional power is generated above what is needed to fill contractual demands, it is sold on the market; if not enough power is generated, WAPA uses funds in the Basin Fund to purchase power on the market to meet its contractual demand to its customers. The Federal government does not earn profits from generating hydropower. It is a cost-based project. WAPA only charges its customers the cost of operating and maintaining the project in its power rate. The 1992 Grand Canyon Protection Act (GCPA) provided the opportunity to book the costs of environmental programs to the U.S. Treasury in lieu of its repayment obligation for the construction costs incurred in building the project. The Grand Canyon was designated a national resource and costs incurred by the GCPA were intended to be borne by the government, not by project beneficiaries. This created a non-reimbursable bucket of activities – the Glen Canyon Dam Adaptive Management Program (GCDAMP) &

UCRIPs, Glen Canyon Dam experiments, water quality and consumptive use studies. Some red flags seen in the Basin Fund:

- Reduced funding for non-reimbursables
- Inability to firm rates – risk of cost recovery charge
- Deferred replacements for aging parts of the system
- Ahead on repayments of the loan (not good)
- Reduced funding for operations & maintenance

The Basin Fund was set up to support the operations and maintenance of the project. It cannot support a \$40 - \$80 million non-reimbursable expense. Non-reimbursable expenses should be scaled at a level that meets the repayment obligation to the Treasury. At the last TWG meeting we discussed the idea of setting up an experimental fund. Experiments may also have non-Basin Fund related impacts which need to be considered before implementation. Other ideas are welcome about how to adjust the “elegant solution” of using non-reimbursable expenses to meet our repayment obligations. It worked well in the past, but is now struggling. Suggested solutions should consider the intent of the GCPA in having associated costs being borne by the Federal government and not by project beneficiaries.

#### **Discussion Followed**

**[Kelly Burke, Grand Canyon Wildlands Council (GCWC)]** Is the power rate / contracts an iterative process to arrive at the financial terms? **[Craig]** Yes, but they are long term contracts, and do not change quickly; it is over decades. The Power Rate is also decadal. **[Leslie James, CREDA]** Actually the Power Rate is a shorter timeline. CREDA just closed a two-year rate and is hoping to start a 5-year rate next. That is why the Basin Fund must be big enough to float the shorter-term fluctuations.

### **Status Report for Developing a Plan to Amend the High-Flow Experiment Protocol (Presentation)**

**[Sinjin Eberle, American Rivers]** Proposal key points:

- Move to a single Annual Sediment accounting period that resets July 1
- Spring implementation window will be extended from April to June
- The Planning and Implementation (P&I) Team can recommend deferring a Fall HFE and still use Fall Sediment

Need to continue to address outcomes/compliance pathways. A list of things discussed in the FLAHG but not pursued was provided in the presentation.

#### **Discussion Followed**

### **Lessons Learned from WY2011, the 2008 Spring High-Flow Experiment, Origins of the Trout Management Flow Concept, and Considerations for the Future (Presentation)**

**[Josh Korman, Ecometric Research and GCMRC Cooperator]** starts with chart graphing rainbow trout populations over time. Boom / bust cycles are consistent from 1992 – 2022. Short history: Spring HFEs were banned through 2020 due to the spike in trout after the 2008 HFE. Equalization was outside of scope as a mitigation. LTEMP EIS now includes trout population management actions with HFE and balancing. Reference slides for details on fish spawning and population. Bottom line: Expect high volumes of young trout in 2023 but cannot differentiate whether root cause is HFE versus balancing flow.

## **Discussion Followed**

[**Colleen Cunningham, NMISC**] Does this mean that algae food base or insect food base is depressed after an HFE? [**Josh**] Algae and invertebrates are both scoured during the flood, but then it comes back healthier and ends up higher than shown in the no-flow graph. [**Charles Yackulic, GCMRC**] Research from other rivers suggests algae (diatoms) respond in 1 – 2 weeks, bugs longer. [**Josh**] For invertebrates it is 5 – 6 weeks. [**Colleen**] This goes against the earlier statement today that it takes over a year for food base to recover from a flow. [**Josh**] Yes, that is true. [**Charles**] Some parts of the food base may take longer, but it will come back healthier, so there is a net positive. [**Ryan Mann, AZGFD**] The rapid food recovery may be more beneficial to trout than other species. The longer timeline to recover may be related to humpback chub food base. Also, a fall HFE has different impact. [**Josh**] I would wait until fall data is available to draw conclusions.

## **Preliminary Field Reports from the April High-Flow Experiment (Presentations)**

[**Joel Sankey, GCMRC**] NPS started this work with the tribes in 2019 to remove nonnative plants from sand bars. April 2023 was the first HFE since that work started. Seeing an increase in sand deposits after the HFE, but also seeing erosion into the vegetation management areas. Refer to a recently published article on Archaeological site erosion in Grand Canyon National Park.

[**Paul Grams, GCMRC**] The goal is to investigate how HFE impacts the Columbine Reach, a bend in the river in western Grand Canyon. They collected in 3 spots, results not completed yet, but preliminary findings show 3x more sand after 2023 HFE compared with earlier HFE events. Sand also seems to be coarser. Shared photos of the sites measured; all photos are available at the GCMRC website.

## **Discussion Followed**

## **Public Comment**

No Public Comment Received

**Meeting adjourned at 4:36 PM PDT**

## Day 2: Thursday, June 15, 2023

**Start Time:** 9:05 AM PDT

**Conducting:** Seth Shanahan, Southern Nevada Water Authority (SNWA) and Technical Work Group (TWG) Chair] Kathy Callister, Bureau of Reclamation (Reclamation), acting Designated Federal Official  
**Meeting Recorder:** Beccie Mendenhall, SeaJay Environmental LLC

### Welcome and Administrative

- **Introductions and Determination of Quorum:** A quorum was reached.
- **Unresolved Issues from Yesterday's Meeting:** [Seth Shanahan, SNWA] SMB actions deferred until after presentations today. FLAHG proposal was given more time yesterday, which will be reviewed at a webinar scheduled for August 9 at 2 PM PDT.
- **Additional Agenda Items:** [Paul Grams, GCMRC] Requests to present on Waterflow and Debris Flow projects, which was added to the 2:45 session.

### Report Out and Recommendation from the Budget Ad Hoc Group for the Fiscal Year 2024 Budget and Work Plan (Presentation)

[Erik Skeie, CWCB and Budget Ad Hoc (BAHG) Chair] The goal was to come up with a 3-year plan starting in January with completion in June. BAHG had issues this year due to the supplemental EIS (SEIS) and the SMB EA, which tied up needed resources. An emergency was called at the February AMWG meeting in which it was agreed to shift to a one-year budget with a two-month timeline to deliver. BAHG's first meeting was May 4 with its proposal sent to TWG on June 9. (Refer to the slide with the proposed budget changes.)

[Bill Stewart, Reclamation] Budget Overview: \$11.36 M total budget - 80% GCMRC / 20% Reclamation. Table on the bottom is a summary of the triennial plan. The only difference is additional \$25K for tribal monitoring projects, other than that everything is carrying over as before. Reference slides for budget details.

#### Discussion Followed

[Andrew Schultz, GCMRC] Here are the GCMRC Budget / Actual details for FY 2023 \$9.1M FY 2023 budget (\$42K over budget). Issues came up that prevented copy of 2023 as 2024 budget. Increases in Salary (7%) logistics (10%) offset by savings due to reduced overhead (reference slide). End result: \$9.07 million for FY 2024 is actually slightly under FY 2023 due to the overhead savings. May have some additional funds at the end of year, which will be evaluated in August. What would they do if they found additional funds? Five projects prioritized top to bottom plus three additional areas (reference slides). The final recommendation from BAHG to TWG is to move funds from Project N to fund the five projects in priority order. These are identified in Column N in the GCMRC detail budget spreadsheet.

#### Discussion Followed

[Craig Ellsworth, WAPA] How can we avoid finding ourselves in this same situation next January where resources are not available to help with modeling and data needed for the budget? [Bill Stewart, Reclamation] It is going to be like this for at least three years, through 2026. Reclamation is working to identify other sources to fund resources for this work. [Seth Shanahan, SNWA] Would like a report on how the supporting organizations will make changes to support the BAHG process in 2024. [Scott VanderKooi, GCMRC] We have been successful in bringing in talented post docs to help. Also, GCMRC continues to provide support to the GCDAMP.

## Development of Budget Recommendation to the Adaptive Management Work Group

### TWG Members

**[Kurt Dongoske, Pueblo of Zuni]** There has been no compliance for several years with the SMB EA. The Memorandum of Agreement (MOA) for that project is still in development between Zuni and Reclamation, which are not yet aligned. There was SMB action implemented in the slough that Zuni objected to without an MOA in place. There has been no response to the Zuni leader's letter objecting to this non-compliance. He would like to see compliance addressed within this group. Reclamation cannot continue calling it an emergency and bypass the compliance responsibility. If this continues it will negatively impact the relations with Zuni Tribes due to 15 years of lethal actions against fish populations. Compliance needs to be considered by the TWG.

### Motion on TWG FY2024 Budget Recommendation to AMWG

*The Technical Work Group (TWG) recommends that the Adaptive Management Work Group (AMWG) recommend for approval to the Secretary of the Interior, the Fiscal Year 2024 budget as shown on the budget worksheets presented to the TWG on June 15, 2023, with the following additional guidance:*

*The TWG recommends that any lethal management activity performed under the Glen Canyon Dam Adaptive Management Program (GCDAMP) Work Plan complies with the 2017 Programmatic Agreement for Long Term Experimental Management Plan and the National Park Service 2019 Expanded Non-Native Aquatic Species Management Plan Programmatic Agreement prior to implementation of that action.*

*The TWG recommends that Grand Canyon Monitoring and Research Center (GCMRC) and Reclamation coordinate on Project N elements for FY24 with the TWG before the August AMWG meeting.*

*If funds become available, the TWG recommends those funds are used to fund the work items listed below in order of priority:*

*Priority 1 -Short Term Rapid Response Under the Invasive Species Strategic Plan – Invasive Fish Species Below Glen Canyon Dam: A Strategic Plan to Prevent, Detect and Respond was adopted by the AMWG on February 16<sup>th</sup>, 2023. Should short term response be necessary in FY24 under this Strategic Plan, the Department of the Interior should prioritize available funds outside of the GCDAMP. If other funding sources have been exhausted, the Department of Interior may consider use of the Reclamation C.5 Experimental Management Fund and the C.6 Native Fish Conservation Contingency Fund. Such actions that may require use of these funds must be coordinated with the AMWG as proposed in the Strategic Plan and Budget Ad Hoc Group process.*

*Priority 2 – Continue Project Element G.6, Juvenile Chub Monitoring-West*

*Priority 3 – Continue sampling at two sub-reaches for Project Element H.2, Experimental Flow Assessment of Trout Recruitment*

*Priority 4 – Continue Project Element C.3, Riparian Vegetation Predictive models and synthesis*

*Priority 5 – Other Additional Requests identified in the GCMRC FY24 Table*

**[Leslie James, CREDA]** Motion made to accept the recommendation. **[Craig Ellsworth, WAPA]** Seconded. **[Seth Shanahan, SNWA]** Motion passed by consensus.

## **Bug Flows – Latest Findings and General Discussion (Presentation)**

**[Craig Ellsworth, WAPA]** I made some slides for discussion prior to the official presentation. That is what the TWG is for, an opportunity to discuss between the various groups. What was the purpose of the bug flows? Investigate if modified water flow patterns could increase midge abundance, improve egg laying, improve food base. If successful, you would see smoothing of the midge spatial pattern curve, increased midges and caddisflies, increased diversity. This data is not represented in the reports. Diversity has never been measured. There has not been any presentation on caddis flies in the tributaries versus the main branch, and no data on drift or that they have had the lowest populations since 2020. Are the conclusions valid? Have we proven the desired effects on bugs? We need statistically significant findings, and not eyeball assessments. These slides were sent to Ted before the meeting and would like to have a discussion on these points.

**[Ted Kennedy, GCMRC]** Starts by showing Craig's slide; confirms 3 of the 4 points will be addressed in presentation. Why do bug flows? Algae are the base of the food system for fish, and steady flows protect this subsystem. After bug flow implementation, midges were at lowest volume ever recorded. Drift data also does not seem to support the suggested benefits of steady state. But data on trout population bug consumption shows an increase after bug flow implementation (charts shared of 2012-2017 versus 2021). Conclusion GCMRC drew: Bug flows have a positive impact on trout growth. Also, anglers reported catching more fish when the flow is steady on the weekend during bug flows. Part 2 Grand Canyon results: there was a 58% improvement in fish populations due to bug flows on weekends. Bug Flow experiment was stopped in 2021, during which an independent Scientific Advisor reviewed the work, then it was turned back on again in 2022. Increases were seen in insects after the 2022 implementation. GCMRC will stand by the conclusion that bug flows improve fish populations.

### **Discussion Followed**

## **Update on the Status of Smallmouth Bass, Interagency Non-Native Fish Charter, and Other Non-Native Fish**

**[Jeff Arnold, NPS]** Scope of work is Glen Canyon Reach and National Recreation Area with electrofishing and netting from the Dam to Slough (three miles south) to Lees Ferry (15.5 miles south). Two trips have been completed to date after the HFE on April 28. Thirteen SMB were caught from the two trips. The Upper Slough was treated last year and found to be empty of fish before the HFE. Now there are many fish, especially green sunfish. Much lower counts were found in the Lower Slough, and no green sunfish. Water temperatures at Lees Ferry have been causing an increase in young-of-year (YoY) since 2010. Water temperature in 2023 was only slightly lower than 2022.

### **Discussion Followed**

**[Colleen Cunningham, NMISC]** Are those walleye numbers typical? And second, what type of temperature loggers are you using? **[Jeff]** Temp loggers are Hobo Onset Version 2. I do not have normal numbers, although these numbers do seem higher **[Ryan Mann, AZGFD]** We do tend to see walleye close to the dam, assume these are entrained. **[Colleen]** Nothing to be concerned about yet? **[Ryan]** Something to monitor, we have not seen the confirmed reproduction yet. These are cool water fish; unlikely you will be getting many with electrofishing.

**[Ryan Mann, AZGFD]** Shared summary from trips in March, April, and May. The numbers are like Jeff's report, suckers are an interesting new datapoint, probably due to warmer waters. On the fall trip, AZGFD typically sees only native fish. It will be interesting to hear that report.

### **Discussion Followed**

**[Laura Tennant, NPS]** Leading Rapid Response for SMB, working with Jeff on camping protocol, focusing on back waters. Measured both before and after the HFE event. No SMB were caught with electrofishing, but a few other warm water non-natives were caught. NPS plans to continue this sampling once per month through the season (through October).

**[Charles Yackulic, GCMRC]** GCMRC sampled in April with 90% non-native including SMB, all closer to the dam (1 year old fish). May trip for Chub monitoring found 9 walleyes in one location, unusual (200-300 mm in size).

**[Clarence Fullard, Reclamation]** No SMB were found above the dam, including the site closer to the dam. **[Bill Stewart, Reclamation]** Reclamation was asked to put a charter together on the fish monitoring activity with USFWS and NPS. Laura has set up bi-monthly calls to help with coordination. Will share the charter with TWG.

### **Studies to Modify the -12 Mile Slough (Presentation)**

**[Tim Randle, Reclamation]** The slough was created after the dam installation (reference 1952 pre dam picture in presentation). Surface is small boulders, gravel, sand. Temperature profiles for the slough are consistently warmer than the river. It is also warmer on the weekends during bug flows. The proposal is to make modifications to the slough that will reduce or eliminate the temperature differential. Suggest 3 phases: Phase 1 – partially drain upper slough; Phase 2 – Lower elevations of the side channel with excavation, move sand to upper slough (helps fill); and Phase 3 – Narrow the lower slough with fill material. Implementation slide presented level-of-effort estimates but no cost details. Hydraulic modeling slide shows velocity of flow and expected impact of the proposed changes. End result should be that temperatures in the slough are more aligned with river temperatures.

### **Discussion Followed**

### **Informational Updates**

**Willow Flycatcher and Yuma Ridgeway's Rail Surveys:** **[Miranda Terwilliger, NPS]** NPS surveys endangered birds on the river with three surveys for willow flycatcher every other year between May and July. Willow flycatcher were detected in May. On alternate years, NPS surveys for cuckoo and whiffle, and both of these species were detected. Cottonwood wetlands are found only at the 260-mile mark while the only reedy marsh in the canyon is at the 275-mile mark, which was burned by campers in 2018.

**[Larry Stevens, GCWC]** Is Spencer Creek surveyed? Birds used to be seen there. **[Miranda]** No, there is not much water there anymore. It is not good marsh habitat. NPS is focused on the lower area with good habitat. **[Larry]** What about Canada goose? **[Miranda]** Yes, they are present, although they don't seem to use these two marshes.

**Smallmouth Bass SEIS Update:** **[Bill Stewart, Reclamation]** The SEIS is on hold until the new state proposals have been fully analyzed. There will be a new comment period. Intent is to have a final SEIS by the end of the year. Tomorrow's Federal Register will have a Notice of Intent for post 2026 with a comment period through August 15. The SMB EA is transitioning to the EIS and is being coupled with the sediment accounting period. That effort will be an August timeframe, around the AMWG meeting.

**[Colleen Cunningham, NMISC]** The SMB and sediment accounting period will be a supplement to LTEMP? **[Bill]** Yes, a supplemental EIS to the LTEMP. **[Larry Stevens, GCWC]** What is the timeframe for the SEIS? **[Bill]** By next summer. **[Seth Shanahan, SNWA]** That means the normal process will be followed all of next year and the new accounting procedure would be starting in 2025.

**Possible Experimental and Management Actions in the Next 12 Months:** **[Clarence Fullard, Reclamation]** Reclamation is nearing the end of the spring sediment accounting period; on July 1, the fall



accounting will begin. Will start monitoring sediment load in the upper canyon as it comes in from the Paria River. The P&I Team should be scheduling holds for early September to have a fall HFE. Expect to send notices in late August. The P&I Team will also revisit the convention for sharing positions on experiments. After discussion with David Toppings and Paul Grams about sediment work, Reclamation will support new staff at GCMRC for modeling support.

**Debris Flow Project: [Paul Grams, GCMRC]** There is a risk to campers from debris flow hazards especially at the mouths of tributaries where there was a fatality in 2022. USGS has a Risk Strategy track, which had an open funding opportunity around hazards. The goal is to elevate understanding and communicate risk. The plan is to deliver this through a Stakeholder workshop scheduled for September 19 in Flagstaff. Shana and Erica will also be going on a Grand Canyon youth trip and discussing this with the kids on that trip. **[Larry Stevens, GCWC]** In many cases there are also rock falls not associated with debris flows. Will you incorporate that as well? **[Paul]** We thought of that, but it is likely outside of scope for the current grant. Plus, rock falls can occur anywhere. **[Bill Davis, FFI/TU]** Any issue with free flow fishing? They are not on the informed list. **[Paul]** Consider yourself informed and we can add you personally to the list. **[Ben Reeder, GCRG]** One idea that comes to mind is developing a website with forecast risk based on weather, which was done for avalanches. **[Paul]** Thank you for that. Please come to the workshop and bring these ideas. **[Kelly Burke, GCWC]** Suggest adding Grand Canyon River Outfitters Association, and possibly individual outfitters. **[Paul]** Yes, we want input from all stakeholders. Contact Erica Byerley or Paul Grams for more information (email details on slide).

**Waterfalls in Reservoirs Project: [Paul Grams, GCMRC]** Tracking the development of Nickpoints in the sediments of declining reservoirs. Rivers end up with a slightly different course, but not much analysis has been done to date. Erosion may have no impact, or it may cause rapids or a waterfall. GCMRC started monitoring erosion in 2020 through May 2022. The net change has been up to 11 meters (30 feet). **[Colleen Cunningham, NMISC]** Are you looking at both the Glen Canyon waterfall area and the Paria falls? **[Paul]** Yes. **[Colleen]** The Technical Service Center is looking at ways to bypass Paria falls. There are preliminary designs, but they have not been approved. **[Paul]** Yes, I heard about that. **[Seth Shanahan, SNWA]** Is the purpose for native fish passage? Are you coordinating with fish biologists to understand how these serve as fishferriers. **[Paul]** Yes, that is the motivation. **[Seth]** Very helpful to know in thinking about the EIS in the future such as what those specific elevations are and how they might serve as fishferriers. **[Ryan Mann, AZGFD]** We are monitoring that at Pierce Ferry rapid. **[Seth]** From Pierce Ferry, I have 1,116 feet as the number in my head. If that number changes, please share it. **[Paul]** It is more like 3,570 feet.

## **Discussion of Emerging Issues, Updates on Items of Interest That Are in Consideration for Implementation Before Next TWG Meeting, and Request for Agenda Items for Next Meeting**

A request was made for information on the performance of the bypass tubes after the HFE even though this was not the primary goal of that experiment.

**[Clarence Fullard, Reclamation]** Mike Barret from Utah State University (USU) and Mike Horn can provide an update on Lake Powell project as part of an update on fish exclusion. Requests that Jeremy add this as an agenda item for the next meeting. **[Seth Shanahan, SNWA]** That would be great. I have heard some of our AMWG members say how important fish exclusion is, and have specifically requested that it is included in the EIS.

## **Public Comment**

**[Alicyn Gitlin, Sierra Club]** I heard there was a lively conversation yesterday about SMB, which I was not here for. I would like to talk to some people and learn more about that. It was a huge disappointment that the SMB action got delayed one year, and now possibly two years. I like how you politely called it “uncomfortable”. It might be more than uncomfortable; it may be putting endangered species in jeopardy. Instead of having a scientifically based creative solution that is short term, we are looking at a lengthy, more expensive, controversial, and likely unsuccessful management that is going to jeopardize humpback chub in the long term. I am sorry to hear this decision was made for financial considerations related to power production when there is a legal, moral, and ethical mandate to protect the Grand Canyon. It is unfortunate and difficult to witness this as a slow-motion disaster. I hope that any future action can happen as quickly as possible so we can see what needs to be done and take action to protect our endangered species.

**[Taylor McKinnon, Center for Biological Diversity]** I agree with Alicyn’s concerns that economic triggers are pushing us into an EIS that delays consideration of flows. Dam screens were considered as far back as the 2016 LTEMP but have not been implemented yet. This is very worrisome to us. The future is one with less water, lower flows, and warmer water in the Grand Canyon. Everyone is working hard. There is brilliant research being done, but we have an urgency to resolve this.

**Meeting adjourned at 3:37 PM PDT**



## Acronyms

°C – degrees Celsius

AMWG – Adaptive Management Work Group

ADWR – Arizona Department of Water Resources

AHAHG – Administrative History Ad Hoc Group

AZGFD – Arizona Game and Fish Department

BAHG – Budget Ad Hoc Group

CRBC – Colorado River Board of California

CRCN – 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

DWR – Department of Water Resources

EA – environmental assessment

EIS – environmental impact statement

FLAHG – Flow Ad Hoc Group

FFI – Fly Fishers International

FY – Fiscal Year

GCDAMP – Glen Canyon Dam Adaptive Management Program

GCMRC – Grand Canyon Monitoring & Research Center

GCPA – Grand Canyon Protection Act

GCRG – Grand Canyon River Guides

GCWC—Grand Canyon Wildlands Council

HFE – High Flow Experiment

LTEMP – Long-Term Experimental and Management Plan

MOA – Memorandum of Understanding

mm – millimeter

NEPA – National Environmental Policy Act

NMISC – NM Interstate Stream Commission

NPS – National Park Service

NPS-GLCA – Glen Canyon National Recreation Area

NPS-GRCA – Grand Canyon National Park

PDT – Pacific Daylight Time

P&I Team – Planning and Implementation Team

Reclamation – Bureau of Reclamation

ROD - Record of Decision

SEIS – supplemental environmental impact statement

SMB – smallmouth bass

SNWA – Southern Nevada Water Authority

TRGD – Trout Recruitment and Growth Dynamics

TU – Trout Unlimited

TWG – GCDAMP Technical Work Group

UCRIP – Upper Colorado River Implementation Program

UMPA – Utah Municipal Power Agency

USFWS – United States Fish & Wildlife

USGS – United States Geological Survey

USU – Utah State University

YoY – Young-of-Year

WAPA – Western Area Power Administration