

Glen Canyon Dam Adaptive Management Work Group Meeting (webinar) May 20, 2020

Start Time: 9:00 AM Mountain Daylight Time (MDT)

Conducting: Dr. Timothy “Tim” Petty, Assistant Secretary for Water and Science, Department of the Interior (DOI)

Recorder: Carliane Johnson, SeaJay Environmental, LLC

Welcome and Administrative: [Tim Petty, DOI Assistant Secretary for Water and Science and Secretary’s Designee](#)

Introduction and Determination of Quorum (13 members)

[Tim Petty, DOI] Welcomed newly appointed and reappointed Glen Canyon Dam Adaptive Management Work Group (AMWG) and Technical Work Group (TWG) members. A quorum was reached with 14 members or alternates represented. Several member nominees were also present. Attendees introduced themselves with their affiliations.

Approval of [February 12-13, 2020 meeting minutes](#) (*postponed until August 2020*)

The minutes were just sent out so will wait until August to approve to give everyone time to review.

Action Item Tracking Report Update ([presentation](#))

The following updates were reported by Lee Traynham, Reclamation:

- AMWG consideration of next 20 years of the Long-Term Experimental and Management Plan (LTEMP). Reclamation is committed to streamlining of the guiding documents and to developing monitoring metrics to track resource conditions. It is anticipated that progress will be made in the upcoming work plans. It is a major focus.
- Tribal funding for their participation in the AMWG. These funds are not coming out of the AMWG budget, but instead are appropriated dollars contributed by each of the DOI agencies. This has been under discussion and the determination was made that participation funding in the Triennial work plan for Fiscal Years (FY)21-23 will remain at current levels.
- TWG to take up High-Flow Experiment (HFE). The Flow Ad Hoc Group (FLAHG) has been established and is chaired by Peggy Roefer, Colorado River Commission of Nevada. The FLAHG is working with Grand Canyon Monitoring & Research Center (GCMRC) to develop a hydrograph with a potential for a release as early as spring 2021. This item has been addressed.

Progress on nominations and reappointments

[Tim Petty, DOI] There has been good progress moving nominees forward through the process. Last year there were some delays, and it was important to get input from new leadership in the states and invite them to submit nominees.

Impacts from and response to Covid-19

- a. **[Tim Petty, DOI]** Secretary Bernhardt is in New Mexico and Arizona today to reopen some of the National Park Service (NPS) sites. The federal government is working with state governors' offices. The primary consideration for opening parks and offices is on public health, especially for those with pre-existing conditions. Tribes are also working hard to address public health issues.
- b. **[Brent Esplin, Reclamation]** Since mid-March, Region 7 has been on maximum telework. It has been working well. For example, a power plant rotation program was implemented with three-person crews that are in their duty stations for a week and then working elsewhere for a week. Managed to do this with very few closures of facilities and keeping some contract work going such as with the Navajo Nation on construction of a regional water system in New Mexico. Some maintenance work will slow down. Hope to bring some people back in the next couple of weeks.
- c. **[Jan Balsom, NPS Grand Canyon National Park (GRCA)]** GRCA's new superintendent Ed Keable has been on the job for eight days. It is an odd and challenging time to arrive when the park is closed. Ed will attend the next AMWG meeting. GRCA has a year-round community of 2,500 people to service such a big operation, all of which was suspended, but it is starting to open bit by bit. There was a limited South Gate opening last weekend with 1,000 to 1,100 people coming in per day. The East Entrance will remain closed in deference to what the Navajo Nation is facing. This weekend the park will enhance further services to allow for overnight use and day hiking. The visitor center, food services, and others places will remain closed. Maybe 5,000 to 6,000 visitors will be allowed in the park, which seems a reasonable amount to host. Concessionaires are still working on their re-opening plan. GRCA is using Centers for Disease Control (CDC) guidance to figure out ways to resume river operations, which is hoped to launch June 14. Everybody needs to get back on the river, but we need to do it safely without taxing the park's capabilities and knowing these trips will be going through Navajo Nation.
- d. **[Billy Shott, Superintendent, Glen Canyon National Recreation Area (GCNRA)]** GCNRA has been challenged with the same sets of conditions that other parks have faced. The park has been able to stay open only if it can be done safely. Several use areas and visitor centers have been closed. There had been staffing issues, along with Arizona and Utah, on invasive species management mostly related to aquatic mussels. This resulted in temporary changes to regulations to continue to monitor and record, which turned out to be effective. The largest access issue was closing the boat ramps. This weekend will be the first to have all ramps open except one. A number of areas remain closed where GCNRA does not have the resources available to manage. There are concerns for

Navajo Nation about the Antelope Point Public Use Area and Ramp. The park is working with everyone to figure out what that re-opening will look like.

- e. **[Scott VanderKooi, U.S. Geological Survey (USGS) GCMRC]** GCMRC has been on telework for two months now. Looking at moving back over next weeks to months. Teleworking has ranged from easy to difficult depending on the position such as those working in the sediment and aquatic labs. There have been a number of limitations for field work due to the river closures and for the Navajo Nation. This has involved working with colleagues to do some small field activities that included fixing gauges and taking shorter day trips with one to two people. Spring (April through May) is typically a very busy field time and have had to make difficult decisions. Half of the trips were canceled and the rest have been postponed. Trips that were seasonally dependent, such as when fish are moving, were the ones canceled. GCMRC is also supporting its tribal partners on their river trips (one was cancelled and three postponed until the fall). Scott appreciates everyone working through this challenging time. The health and safety of staff have been most important.

Tribal Liaison Report: Theresa Pasqual, Tribal Liaison for the Glen Canyon Dam Adaptive Management Program (GCDAMP)

The impacts from Covid-19 are on everyone, but worst by far have been the impacts on the tribal communities. Tribal colleagues are in the states of Arizona, Utah, and New Mexico with the Navajo Nation spanning across all three states. There are jurisdictional challenges and the tribes are operating in a changed environment. We have a number of different programmatic goals to achieve this year and other processes in play such as the triennial work plan and budget. We need to keep these things moving along. Theresa is very grateful to Reclamation (Lee and her team) and GCMRC (Scott and his team) to step up the number of webinars and calls and other outreach they have done to respond to tribal colleagues. Our communities are all different in size and resources available. We need to ensure that everyone can receive our communications because some are limited in internet access and mail delivery. Theresa checked in with her colleagues in April when they were beginning to see cases in their communities. Tribal communities have been some of the hardest hit by the pandemic. Concerns include impacts to the tribal elders, who do a lot of cultural work. The communities are under extreme closures, many through the end of May while the Navajo Nation is closed through June 7. We need to double down on our communication efforts to make sure they are receiving information. As states and other businesses open up, people need to realize that many tribal communities will still be dealing with this.

GCDAMP Triennial Budget and Work Plan Development Process: Seth Shanahan, TWG Chair and Craig Ellsworth, Budget Ad Hoc Group (BAHG) Chair ([presentation](#))

[Seth Shanahan, TWG] The process schedule was approved by AMWG March 6, 2019. It is an intense process to develop the budget and work plan that started with the annual reporting meeting in January, then established priorities in February. There has been a lot of activity since. Seth thanked everyone who has been part of that process and provided information to support the discussions. One of the successes of an adaptive management process is the participation of the stakeholders. There is nothing specific for AMWG to be doing in May, but it is still important for this body to provide direction. Currently, the TWG received the second draft of the work plan on May 20 and will be reviewing it over

the next two weeks. Comments will be provided to federal agencies by June 8. The third draft will be available before the June 23 TWG meeting in which recommendations will be developed. The final draft will be prepared and submitted to AMWG on July 29. TWG will then submit recommendations at the August meeting. It has been very helpful that everyone is following the schedule, which helps us to achieve the deadlines.

[Craig Ellsworth, BAHG] Craig appreciates everyone's participation. It has been great. The last two BAHG calls will be to: 1) talk to science advisors about their impressions, and for 2) BAHG to discuss their recommendations. There may be some flexibility in the dates to make sure everyone can review the second draft. There is a BAHG site on the Wiki, which contains notes from calls and other information.

Q&A/Discussion

[Larry Stevens, Grand Canyon Wildlands Council (GCWC)] **What about the backlog of maintenance at the dam? Will that result in a flurry of activities?** *[Brent Esplin, Reclamation] Some is just routine maintenance that can be caught up on pretty quickly. Bigger issue may be the transformer replacement contract, which may affect future releases.*

Overview of Draft FY21-23 Triennial Budget and Work Plan ([presentation](#))

[Lee Traynham, Reclamation] Everyone is reminded that there are a number of guidance documents to meet compliance obligations. There is also general uncertainty with respect to both source and amount of funding in future years. This needs to be considered and incorporated into the work plan with an eye to remaining flexible and adaptable. Reclamation started its baseline for the upcoming Triennial Budget and Workplan with the 2018-2020 budget. The current budget looks similar with only modest adjustments in proposed funding. One of the most important steps in the process is to incorporate stakeholder input. Lee appreciates everyone's engagement. The feedback resulted in both adjustments and inclusions in the second draft. There were a few changes in Project A and Project B. Project C largely stayed the same except for the addition of Project C-12 to support partners in developing monitoring metrics that came out of the experimental funds. We need to continue to discuss whether we have appropriate funds for that. Biggest difference between the first and second drafts is cultural resources Project D, many of which are compliance requirements. Projects D.5 through D.7 are the items that Reclamation had requested proposals from tribal partners on mitigating dam operations. Seven proposals were received, which will be included in the second draft of the work plan. The next step will be for DOI agencies to flag projects that are closely tied to compliance to arrive at the must-haves versus nice-to-haves.

[Scott VanderKooi, GCMRC budget] GCMRC's emphasis in the work plan is the LTEMP implementation. A number of experiments have to be evaluated each year to make sure they will not negatively impact resources. This is foremost as the work plan is being developed. In the presentation shown, a summary of each of the project's elements was provided along with previous and current triennial budgets, and the LTEMP resources areas for the following: 1) streamflow, water quality, and sediment transport; 2) monitoring sediment storage; 3) riparian vegetation monitoring and research; 4) effects of dam operations on archaeological sites; 5) controls on ecosystem drivers; 6) aquatic invertebrate ecology; 7) humpback chub population dynamics; 8) salmonid research and monitoring; 9) warm-water native and non-native fish monitoring and research; 10) socioeconomic research; 11) hydropower monitoring and research; 12) geospatial science data management and technology; 13) remote sensing overflight in

support of long term monitoring and LTEMP; and, 14) leadership, management, and support. One thing not funded by the Program, but important and worth mentioning, is the Lake Powell Water Quality project. This project is not funded by GCDAMP, but it affects what goes down the river corridor. Overall, there had been a lot of stakeholder feedback, a series of BAHG calls, virtual TWG meetings, and comments received in writing. It was all very helpful, but also challenging because of the varying goals across the groups. For the budget, the most significant change was the overflight remote sensing project. USGS's budget burden also bumps up quite a bit in FY23 because of a new facility. FY21 is above anticipated budget levels. It is hoped to fund the overflight project from that savings. FY22-23 are at expected levels.

Q&A/Discussion

[John Hamill, Trout Unlimited] Why the increase in overflight costs from \$75,000 per year in FY19-20 to \$300,000 in FY22-23? *[Scott VanderKooi, GCMRC] That money was proposed to be set aside to help defray costs of the overflights. The out years are for the processing of the data, but that was largely done when we got to the FY18-20 work plan.*

[Sara Price, Colorado River Commission of Nevada] How was the dollar amount calculated for the monitoring metrics and how would funds be applied? *[Lee Traynham, Reclamation] The dollars in the line item are for subject matter expert support from GCMRC, tribal members, and others. Probably 50% to 75% of the metrics have already been identified for the program. It has been harder to determine appropriate metrics for some of the resources, including whether they will be feasible for modeling and if we can observe their values over time. The funds will complement other funding allocated for the science advisors' work on this effort.*

[David Brown, Grand Canyon River Guides (GCRG)] What happened with the Western Grand Canyon modeling projects? *[Scott VanderKooi, GCMRC] Those projects were included in the first draft, but a way could not be found to fund them with the budget constraints. In the event of an HFE impact on sediments, there is a proposal in the experimental funds project to look at those dynamics in the lower canyon. That is condition dependent.*

[John Hamill, Trout Unlimited] Is there any expectation for conducting a spring power plant capacity flow in FY21-23? *[Scott VanderKooi, GCMRC] There was mention of this in February. GCMRC is brainstorming with the FLAHG. One idea is to put together a low maintenance flow followed by a power plant capacity flow to try to mimic conditions of a spring HFE. There is a hydrograph being discussed. Peggy Roefer is considering a call soon with the FLAHG. [Seth Shanahan, TWG] In addition, it is important to recognize that the FLAHG is having this conversation. We will need an assessment to determine if there is sufficient flow and then FLAHG can make recommendations. In trying to make this process work, we need to be flexible and make sure there aren't any set expectations.*

[Sara Price, Colorado River Commission of Nevada] Will the science advisor take the lead on monitoring metrics? *[Lee Traynham, Reclamation] No, Reclamation and the federal agencies will take the lead on the metrics while leveraging the expertise of the science advisor.*

[Kelly Burke, GCWC] Will the Navajo Nation be involved anywhere in Project D? *[Lee Traynham, Reclamation] The Navajo Nation had a proposal for a vegetation study that was outside of the scope of*

the Colorado River ecosystem. There had been discussions about other potential vegetation work, but because of Covid-19, it was going to be difficult to get any further proposal submitted.

Basin Hydrology and Operations Update: Heather Patno, Reclamation ([presentation](#))

Reclamation has new visual resources. A link is provided in the slide presentation on where to get them. At this time, about 85% of average precipitation has been received in the Upper Colorado. With dry soil conditions coming into the season, the forecast was for below average spring runoff. Then there was a high pressure ridge starting in April that was both dry and 10-20 degrees above normal temperatures. Since April, the snow pack has plummeted for the season. Spring peaks are anticipated soon for the upper basins; some have completed their peaks and are drying out. Every single forecast of unregulated inflow has decreased. For Lake Powell's unregulated inflow, operational decisions are set by the 24-month study although there is a potential for an April adjustment based on elevations. There are no further opportunities for adjustment for water year 2020. Ten percent was lost from April to May due to the warmer conditions and will probably have dryer conditions moving forward. The maintenance schedule for water year 2021 will change because of Covid-19 impacts. There is also the potential for steady lower flows in water year 2021. With the elevations decreasing, the capacities are also decreasing. For Lake Powell, no updated May temperature release data are available, but can expect to see some increases. This is something to watch and be aware of as we move through the season.

Q&A/Discussion

[Tim Petty, DOI] The graphics have been extremely helpful. Please contact Lee if members have questions for Heather or about her analysis. She is a good teacher to help understand the details.

[Leslie James, Colorado River Energy Distributors Association (CREDA)] What would be the other reasons for low steady flows in 2021 besides the overflights? *[Heather Patno, Reclamation] There would be the May low flows over Memorial Day for the overflight that Scott talked about. Also the potential for the 4,000 cubic feet per second maintenance flow for work on the apron at the beginning in March.*

[Kelly Burke, GCWC] When have we seen in the past this change in warming temperatures above normal and what plays out in the summer season? It looks dramatic. Despite a good snow pack, are we more equivalent to a poor snow pack/greater drought environment? How does that fit in with previous years? *[Heather Patno, Reclamation] Will have to get information back to you about previous years. What has happened compared to drought years is because of the dry soil conditions even with the reasonable snow pack. Soils captured a lot of the water in the snow that had melted very quickly and the warm temperatures kept the soils dryer. Runoff conditions are being forecast for the rest of the year.*

Tribal Liaison Program Update (Kerry Rae, Chief of Staff to the Assistant Secretary for Water and Science) ([presentation](#))

We are at a point in the program that allows an opportunity to conduct an evaluation of the Joint Tribal Liaison (JTL) Program in which there are two half-time liaisons. The program lost Sarah Rinkevich at the end of FY19. Theresa Pasqual is currently the only tribal liaison. Kerry thanks Theresa for keeping the program afloat while it is being reviewed. In looking at the guidance, the liaison position reports to the

Secretary's Designee. The key is regular communication between the Designee and liaison. The current term expires September 2020. The plan is to have a vacancy announced and filled by October 2020. Input is now being requested on the JTL program including confirmation of support if you believe the program is beneficial. The new program will likely include a single full-time liaison who works at Reclamation but has a direct line of communication with the Assistant Secretary's office. Submit comments by June 19.

Q&A/Discussion

[Kelly Burke, GCWC] Is the decision to go forward with one full-time position fixed? What is Theresa's experience in this? Kelly thinks the program is valuable. [Lee Traynham, Reclamation] She may be having audio issues. If possible, maybe we will circle back around to Theresa once her connection is restored.

Potential Water Year 2020 LTEMP Experiments and Bug Flow Experiment (Lee Traynham, Reclamation and Scott VanderKooi, GCMRC) ([presentation](#))

[Lee Traynham, Reclamation] The LTEMP Record of Decision (ROD) includes a process to implement flow-based experiments at Glen Canyon Dam. (See the list of potential experiments that were provided in the presentation.) Sand budget model results in the negative show we're not near conditions to warrant an HFE. There will not be a spring HFE in 2020. For trout management flows (TMF) there is still interest in refining the design questions. Expect more conversations on those. The decision memo approving the bug flows experiment was issued on April 24. That led to notifications and a press release. We'll talk in August about a potential fall HFE.

[Scott VanderKooi, GCMRC] It was not an eventful winter or spring for sediment conditions with only about 55,000 metric tons from the Paria River, which is probably an order of magnitude off the trigger for an HFE. There are also declining trends in Upper Marble Canyon. Overall, the balance is negative. Bug flow implementation for 2020 gives bugs the "weekends off." Would expect to see a response with aquatic insect abundance. Seeing some interesting trends. Given the complex ecosystems, this was the recommendation to move forward to a third year of the project, which was approved in late April and the project implemented in May. Have not had the ability to access the river and make use of citizen science. Thanks to Jan and colleagues at Park Service for collecting data since early May. The citizen science effort will resume assuming there is a river re-opening in June. Sill confident that if we collect the data, we should be able to capture peak caddis fly emergence. It will be a challenge if things don't turn out and there is no monitoring in 2020; however, we are looking at an ecosystem response. The experiment will still allow us to detect a response in 2021.

[Crystal Dean, WAPA] There have been no big changes regarding hydropower prices. Remaining funding does not meet end of year target balance, but is good enough to move forward. No major concerns. Everything remains stable as expected.

Q&A/Discussion

[Larry Stevens, GCWC] Can you put the Paria inflows in a flow duration context to see the probability of upcoming spring HFEs? It seems like a normal year for the Paria. [Scott VanderKooi, GCMRC] It is believed this has been looked at, and over time, it has changed. The likelihood has decreased of those events occurring with enough sediments during winter. Even going back to original HFE protocol, with

double peaks in fall and spring/winter, it has changed over the last 10-20 years, but Scott will follow up to get an answer to the question.

[Vineetha Kartha, Arizona Department of Water Resources] Does the \$138 million not meet WAPA's target? What is the target and how short are we? *[Chrystal Dean, WAPA] There are several things that go into that calculation and it is different each year. [Brian Sadler, WAPA] The Basin Fund target balance is \$174 million with \$136.4 million projected for end of this year. Still going to be short. Bug flows are around \$400,000, which is not a significant amount so not as concerned. Projected expenses and purchase power and capital expenditures are all being looked at. A balance of \$174 million is needed to reduce risks.*

Federal Agency Updates

LTEMP Litigation

[Rod Smith, DOI Legal Counsel] The general allegation of the litigation is redo the 2016 LTEMP National Environmental Policy Act (NEPA) document because the climate change discussion was not sufficient. In the wake of Covid-19, many courts have cancelled in-person events, but filings and other electronic work can be done so the litigation continues. New developments include a number of parties that were likely to have intervened, have done so at this point including six of the seven states, water districts, and CREDA. There is a "cross claim" from Irrigation and Electric Districts of Arizona (IEDA), who fit in the middle. Right now, waiting on the filing of the Administrative Record, which is due June 2. Once that is done, will anticipate some briefs filed and a briefing in the fall.

Interim Guidelines 7.D review

[Rod Smith, DOI Legal Counsel] The 7.D review is a reference to subsection 7(D) of the 2007 guidelines for purposes of evaluating the effectiveness of the program some time prior to 2020. This is a high priority. Activities worked on to date include: 1) determining the scope, which was a retrospective look back; and 2) seeking public input on the report with a series of webinars. Next step is to draft the report and get more comments.

Long-term Funding

[Steve Johnson, Western Area Power Administration (WAPA)] On April 12, Reclamation produced a white paper on these programs. This was the culmination of the "Gang of 6" – three people from WAPA and three from Reclamation – to consider what the future will look like with an understanding that power revenues are starting to dwindle. WAPA averages \$12.5 million per year, which is what is being considered. The short answer is that the bulk of that would go to GCDAMP with some funds to the Recovery Implementation Programs (RIPs). This is not settled yet.

[Kathy Callister, Reclamation] The RIP group is starting to meet and gather information to submit a report to Congress in September 2021. The white paper is a starting point to those conversations. Brent is looking to put together a DOI team. A lot of the partners are the same on the two programs. We will keep everyone informed. The good news is that the money was identified in the President's budget for FY21. Now need to see what comes through Congress.

Q&A/Discussion

[Sara Price, Colorado River Commission] Is the workgroup just federal parties? *[Kathy Callister, Reclamation] It is federal, state, tribal and non-governmental partners, specifically focused on the RIP, but applicable to both programs.*

Proposed downlisting of humpback chub

[Kirk Young, US Fish and Wildlife Service (USFWS)] The humpback chub proposed downlisting rule comment period was opened in January 22 and closed March 23. Navajo Nation requested government to government consultations. Will reassess publication of final rule depending on those consultations. The Kanab ambersnail delisting was published January 6 and the comment period closed March 6. Expect finalization on that rule in a year. All comments are accessible at www.regulations.gov. USFWS is working on responding to comments.

Expanded Non-native Aquatic Species Management Plan

[Ken Hyde, NPS] A Finding of No Significant Impact (FONSI) was signed for the NPS Non-Native Aquatic Species Management Plan and everything has been finished with the tribes. The proposal of incentivized harvest is being completed now with \$180,000 in funding for it and looking at additional options. Over the next two weeks, we will be finalizing the agreement with the Glen Canyon Conservancy which will operate the program. Hope to start the incentivized harvest program in October 2020, which will include a kick-off event. Tribal youth will be included as well as rewards for brown trout heads that are turned in by anglers participating in the program. Everything is proceeding as planned.

Technical Work Group Chair Report: Seth Shanahan, TWG Chair ([presentation](#))

The TWG last met by webinar April 15-16. Next meeting will also be by webinar June 23-24. This is when a budget recommendation is planned as well as a lot of other continuing topics. Peggy Roefer, the FLAHG chair, has scheduled a meeting on June 2 on possible hydrographs. After that, we want to evaluate impacts on other resources if that hydrograph is implemented. The measures need to be quantifiable and demonstrable. TWG has also engaged rainbow trout fishery experts on the status of the fishery who have noted a lot of key trends. Also heard from stakeholders that sediment drivers in Western Grand Canyon is an important issue to understand. Don't believe potential next steps are in the current budget plan – will need to discuss this. Regarding the Administrative History Project with Paul Hirt and his team at Arizona State University, this could result in an orientation packet that could be very useful for new members. This history is accessible and permanently archived at www.GCDAMPHistory.org. Feedback is also being requested to be sent to: paul.hirt@asu.edu. Other meeting dates are: October 14-15 and January 20-22.

Q&A/Discussion

[Larry Steven, GCWC] If we do move forward with monitoring metrics would this be an Ad Hoc group? *[Lee Traynham, Reclamation] That is a discussion to have. The federal agencies would likely kick-off the review and then propose next steps to the AMWG. It is presumed they may send direction and action items to the TWG. [Seth Shanahan, TWG] Agree. Would also point to the Record of Decision that this is a DOI responsibility. The longer answer is that after internal considerations and funds directed toward this activity, there will be engagement with the TWG and AMWG and possibly other groups. We want to get this moving along.*

Stakeholder Updates

[Larry Stevens, GCWC] It is hoped to start a restoration plan for Paria Beach in the dead tamarisk area later this year. Another project through Northern Arizona is looking at food base of midge species with diatoms and algae on macrophytic vegetation. Changes have been significant in diatom assemblages over the years and want to document that. This is a two-year study with preliminary results expected at the end of this year.

Public Comment

No public comment.

AMWG Next Steps: Tim Petty, DOI

Next AMWG is August 19-20, 2020. The goal is to meet in Flagstaff. Will keep everyone informed. Will also ask for feedback on items today including the February meeting minutes, tribal liaison program comments, feedback on second draft of triennial budget and work plan, and any feedback on the August meeting agenda.

Adjourned at: 1:10 PM MST

Meeting Attendees

AMWG Members, Alternates, and Leadership

Timothy Petty, *DOI and Secretary's Designee*

Brent Esplin, *Designated Federal Officer*

Cliff Barrett, *UMPA*

David Brown, *GCRG*

Peter Bungart, *Hualapai Tribe*

Kathy Callister, *Reclamation*

Chris Cantrell, *AZGFD*

Kevin Garlick, *UMPA*

Ed Gerak, *CREDA*

John Hamill, *FFI/Trout Unlimited*

Leslie James, *CREDA*

Steve Johnson, *WAPA*

John Jordan, *FFI/Trout Unlimited*

Vineetha Kartha, *Arizona Department of Water Resources*

Charles "Chip" Lewis, *Bureau of Indian Affairs*

John McClow, *State of Colorado*

Jessica Neuwerth, *Colorado River Board of California*

Daniel Picard, *Reclamation*

Peggy Roefer, *Colorado River Commission of Nevada*

Brian Sadler, *WAPA*

Steve Wolff, *State of Wyoming*

Kirk Young, *USFWS*

Bureau of Reclamation Staff

Tara Ashby

Marlon Duke

Clarence Fullard

Heather Patno

Alex Pivarnick

Lee Traynham

USGS/GCMRC Staff

Lucas Bair

Kim Dibble

Helen Fairley

Michael Moran

Jeff Muehlbauer

Emily Palmquist

Joel Sankey

Scott Vanderkooi

Department of the Interior

Kerry Rae, *ASWS Chief of Staff*
Theresa Pasqual, *Joint Tribal Liaison*

Rodney Smith, *Solicitor's Office*

Interested Persons

Todd Adams, *Utah Division of Water Resources*
Jan Balsom, *NPS-GRCA*
Richard Begay, *Navajo Nation*
Rob Billerbeck, *NPS*
Charlie Bullets, *Southern Paiute Consortium*
Kelly Burke, *Grand Canyon Wildlands Council*
Shane Capron, *WAPA*
Tom Chart, *USFWS*
Pat Connors, *Platte River Power Authority*
Kevin Dahl, *National Park Conservation Association*
Kurt Dongoske, *Zuni*
Chrystal Dean, *WAPA*
Sinjin Eberle, *American Rivers*
Craig Ellsworth, *WAPA*
Sheri Farag, *Arizona Salt River Project*
Michelle Garrison, *State of Colorado*
Jessica Gwinn, *USFWS*
Amy Haas, *UCRC*
Paul Harms, *State of New Mexico*
Jeff Humphrey, *USFWS*
Ken Hyde, *NPS-GCNRA*
Sara Larsen, *UCRC*

Jakob Maase, *Hopi Tribe*
Ryan Mann, *AZGFD*
Adam McAnally, *Arizona Salt River Project*
Scott McGettigan, *State of Utah*
Kevin McAbee, *USFWS*
Craig McGinnis, *State of Arizona*
Lisa Meyer, *WAPA*
Christina Noftsker, *State of New Mexico*
Emily Omana Smith, *NPS-GRCA*
Bill Persons, *FFI/Trout Unlimited*
Sara Price, *Colorado River Commission of Nevada*
Dave Rogowski, *AZGFD*
Seth Shanahan, *TWG Chair and SNWA*
Billy Shott, *NPS-GCNRA*
Arianne Singer, *State of New Mexico*
Eric Skeie, *State of Colorado*
Shannon Snyder, *USEPA*
Larry Stevens, *Grand Canyon Wildlands Council*
Jim Strogon, *FFI/Trout Unlimited*
Melissa Trammell, *NPS*
Jeffrey Woner, *K.R. Saline & Associates*

Abbreviations

ADWR – Arizona Dept. of Water Resources
AZGFD – Arizona Game and Fish Department
AMWG – Adaptive Management Work Group
BAHG – Budget Ad Hoc Group
BIA – Bureau of Indian Affairs
Reclamation – Bureau of Reclamation
CDC – Center for Disease Control and Prevention
CREDA – Colorado River Energy Distributors Assn.
DOI – Department of the Interior
FFI – Fly Fishers International
FLAHG -- Flow Ad Hoc Group
FONSI – Finding of No Significant Impact
FY – Fiscal Year (October 1 – September 30)
GCDAMP -- Glen Canyon Dam Adaptive Management Program
GCMRC – Grand Canyon Monitoring & Research Center
GCNP – Grand Canyon National Park
GCNRA – Glen Canyon National Recreation Area
GCRG – Grand Canyon River Guides
GCWC – Grand Canyon Wildlands Council
GRCA – Grand Canyon National Park
HFE – High-Flow Experiment
JTL – Joint Tribal Liaison
LTEMP – Long-Term Experimental and Management Plan
MST – Mountain Standard Time
NEPA – National Environmental Policy Act
NPCA – National Parks Conservation Association
NPS – National Park Service
RIP—Recovery Implementation Program
TMF – Trout Management Flows
TWG – Technical Work Group
UMPA -- Utah Municipal Power Agency
USFWS – United States Fish & Wildlife Service
USGS – United States Geological Survey
WAPA – Western Area Power Administration