

Glen Canyon Dam Adaptive Management Work Group Meeting August 22 - 23, 2018

Motions Approved and Withdrawn

- **Approved Motion:** To approve minutes from the May 22, 2018 AMWG Webinar as amended.
 - Secretary's Designee Alternate Andrea Travnicek introduced the agenda item, changes to the minutes were discussed and clarified, and Andrea asked if there was any objection to approval of the minutes as amended. There was no objection and minutes were considered approved.*
- **Approved Motion:** To consider a motion regarding funding of the GCDAMP.
 - John Jordan moved and John McClow seconded.
 - The motion was approved by consensus, with Steve Johnson (WAPA) abstaining.*
- **Approved Motion:** The Glen Canyon Dam Adaptive Management Work Group (AMWG) has worked assiduously for the past 20 years to provide the Secretary of the Interior with the best advice on operating Glen Canyon Dam consistent with the Grand Canyon Protection Act of 1992, and is concerned about the redirection of Colorado River Storage Project revenues. The AMWG recommends that the Secretary continue to communicate to the Office of Management and Budget, AMWG's concerns about adequate funding for the Glen Canyon Dam Adaptive Management Program and other critically important programs in the Upper Colorado River Basin consistent with Congressional authorizations.
 - Larry Stevens moved and Mike Yeatts seconded.
 - Motion passed by consensus, with Steve Johnson (WAPA) abstaining.*
- **Approved Motion:** AMWG recommends to the Secretary of Interior his approval of the GCDAMP Fiscal Year 2019 budget as described in the attached budget tables dated May 18, 2018 from the Bureau of Reclamation and June 22, 2018 from the Grand Canyon Monitoring and Research Center as revised by the TWG on June 25, 2018.
 - Chris Cantrell moved and John McClow seconded.
 - Motion passed by consensus with Steve Johnson (WAPA) abstaining.*
- **Withdrawn Motion:** John Hamill and John Jordan's motion, that had been included on the agenda, to have a workshop to study the impacts of HFEs was withdrawn.

* While DOI bureau representatives are members of the AMWG, they do not vote on recommendations to the Secretary.

Action Items

- **Previous action item update:** AMWG will consider a process for planning for the next 20 years of LTEMP. August 2018 update: DOI will be working on this over the next year with input from the AMWG with the target to complete the process by the end of 2019.
- **Previous action item update:** AMWG will solicit expertise to address the group on hydropower in the greater context of regional energy. August 2018 update: DOI will continue to attempt to schedule this presentation at a future meeting.
- Reclamation will send the temperature control paper to the AMWG when it is available.
- GCMRC agreed to:
 - (1) conduct a scientific assessment of the effects of past experimental high flows (including powerplant capacity flows) at Glen Canyon Dam on high valued resources of

concern to the GCDAMP (i.e., recreational beaches, aquatic food base, rainbow trout fishery, hydropower, humpback chub and other native fish, and cultural resources); and

- (2) present initial findings in a written summary at the 2019 Annual Reporting Meeting and the March 2019 AMWG meeting for review and discussion.

A next step would be for GCMRC to identify experimental flow options that would consider high valued resources of concern to the GCDAMP (defined above), fill critical data gaps, and reduce scientific uncertainties.

Wednesday, August 22, 2018

Start Time: 9:30 am

Conducting: Andrea Travnicek, Principal Deputy Assistant Secretary for Water and Science, and Acting Assistant Secretary for Fish and Wildlife Service and National Parks Service, Department of the Interior

Facilitator: Mary Orton, The Mary Orton Company, LLC

Recorder: Lauren Johnston, The Mary Orton Company, LLC

Welcome and Administrative

Presenters & Affiliation: Andrea Travnicek, Deputy Assistant Secretary of the Interior for Water and Science and Secretary's Designee Alternate; Brent Rhees, Upper Colorado Regional Director and AMWG Designated Federal Officer, Bureau of Reclamation; Mary Orton, The Mary Orton Company

A quorum (13 required) was reached with 26 members or their alternates present or on the telephone, representing 20 organizational members. Attendees introduced themselves. Andrea welcomed newly nominated AMWG and TWG members to their first meeting. Mary noted that while stakeholder groups whose member and alternate were awaiting confirmation could not participate in consensus or voting on motions, they were welcome at the table and in all discussions.

Approval of May 22, 2018 Meeting Minutes

Proposed changes to the meeting minutes included enhanced details for suggested next steps for the Brown Trout workshop, a change to "WAPA" from "Western" as an abbreviation for Western Area Power Administration, change to "catch rates" from "catch volumes," clarification of some comments by WAPA, and a change in the end date of macroinvertebrate production flows to "August 31" from "August 30." John Hamill clarified that the time period for catch rates referred to the last three months prior to the meeting.

Motion to approve minutes from the May 22, 2018 AMWG Webinar as amended: Secretary's Designee Alternate Andrea Travnicek introduced the agenda item, changes to the minutes were discussed and clarified, and Andrea asked if there was any objection to approval of the minutes. There was no objection and minutes were considered approved. The final meeting minutes as approved are found at [Attachment 1](#).

Action Item Tracking Report

- Katrina Grantz reviewed the [action item tracking report](#) from the last meeting. The following three action items are officially closed:
 - GCMRC monitoring Humpback Chub. This was included in the final version of the FY18-20 Triennial budget and work plan and was reported on during the February 2018 AMWG meeting.

- GCMRC agreed to include monitoring of mussels in the nonnative fish monitoring. This was included in the final version of the FY18-20 triennial budget and work plan, and was reported on at the February 2018 AMWG meeting.
- Reclamation will update the GCDAMP project C to reflect complementary language to that included in the GCMRC project N. This was included in the final version of the FY18-20 triennial budget and work plan, and was reported on at the February 2018 AMWG meeting.
- Two items assigned to and presented by Katrina Grantz are still open:
 - AMWG will consider a process for planning for the next 20 years of LTEMP. The update during the February 2018 meeting was that this will be addressed through the development of monitoring metrics and the streamlining of GCDAMP guiding documents as described in the LTEMP ROD.
 - Update August 2018: DOI will be working on this over the next year with input from the AMWG with the target to complete the process by the end of 2019. This action item will remain open until the entire process is completed.
 - AMWG will solicit expertise to address the group on hydropower in the greater context of regional energy. The February update on this was that it would be addressed with a future agenda item.
 - Update August 2018: DOI did attempt to add this as a presentation for the August 2018 meeting; however, the presenter had to cancel. This action item is still open and DOI will continue to attempt to schedule this presentation.

Progress on Nominations and Reappointments

The request for nominations for AMWG membership was open for 30 days in the Federal Register. DOI received feedback that some members did not have enough time to submit nomination letters. DOI issued another call through the Federal Register for nominations to accommodate those who did not meet the first deadline. As of Monday, August 20, eleven new members have been appointed through the new process. There are a few more in process.

See [Attachment 2](#) for a list of nominated individuals and status of reappointments.

FY 2019 Funding

Presenters & Affiliation: Andrea Travnicek, Deputy Assistant Secretary of the Interior for Water and Science and Secretary's Designee Alternate; Brent Rhees, Bureau of Reclamation Upper Colorado Regional Director and AMWG Designated Federal Officer; Katrina Grantz, Chief, Adaptive Management Group, Bureau of Reclamation; Scott VanderKooi, Chief Grand Canyon Monitoring and Research Center

Presentation Summary

Andrea Travnicek introduced the topic by saying that FY19 funding for AMWG was uncertain at this time. She noted that DOI is tracking this very closely. She asked Steve Johnson from WAPA to present the details.

Steve said there was new administrative guidance received by WAPA from the Office of Management and Budget to no longer forward monies to non-reimbursable programs, including the GCDAMP. These items are not considered for rate recovery in the power rate calculation. Until now, under this process, approximately \$20-23 million per year has been spent on environmental programs. That annual sum was then subtracted from interest owed on capital projects. This year, however, the OMB has directed WAPA to pay that money directly to the Treasury instead of spending it on non-reimbursable programs.

Previously, of the \$20-23 million, WAPA has retained some portion for their work in the GCDAMP. The remainder of the funds were then distributed among the Upper Colorado Recovery Implementation Program, San Juan Recovery Implementation Program, the GCDAMP, and some to consumptive use and loss reporting. About \$12 million per year has gone toward funding the GCDAMP: Reclamation retained about \$2 million of this for program administrative costs and about \$10 million was sent to GCMRC to fund their activities. The two Recovery Implementation Programs received a total of about \$8 million annually.

Reclamation relies on funding for these programs and their outcomes to provide ESA compliance for continued operation of CRSP facilities. This funding provides ESA compliance for roughly 2,500 water projects in the upper basin.

There are legislative discussions taking place in both houses of Congress to secure funds for these programs. There will hopefully be a conference committee in early September to work through that language. People are realizing how important the GCDAMP is, but there is still a level of uncertainty.

Discussion/Q & A

- Steve Wolff asked if the money would stay in the Basin Fund until WAPA does their normal transfer to Treasury. Steve Johnson confirmed that this was his understanding.
- Steve Wolff asked if WAPA had any leeway to decide how much money they could pay back to Treasury. Steve Johnson confirmed that WAPA does do some analysis prior to returning dollars to Treasury, but he does not know how much leeway there is in determining that number.
- Steve Wolff asked what Reclamation has been doing to plan for FY19 if the budget is not restored. Brent responded that Reclamation is working through a series of 'what if...' scenarios, for example: if OMB maintains this directive, if Congress doesn't provide any relief, etc. Reclamation could consider a reduced program and options for using different appropriated funding. Reclamation has to stay in compliance with RODs, BOs, water decrees, etc. If power revenues will not cover this, Reclamation could look for other funding. Brent noted that there is another unknown under the scenario of a continuing resolution (CR). Under this circumstance, Reclamation would consider a bridging scenario, looking at unobligated, carry-over funds, or appropriated dollars that Reclamation may have obligated to spend but have not yet been spent.
- Dave Nimkin asked, as part of the political process, what discussions have been going on in the Basin States, and could NPCA's participation in those discussions be helpful? Steve Wolff noted that he has been working with non-federal partners including NGOs, Tribes, and States. The group is pursuing every channel to fix the funding issue. In March, congressional offices said it would be fixed, but that has not yet happened. Starting in FY20, Steve believes there will be a congressional fix; there is state and appropriations committee support for that. The main concern, then, is FY19. If there is no funding in FY19 and the programs stop, it's not easy to start them back up again in FY20. He reported having requested a meeting with OMB. The principals of the seven basin states wrote a letter to OMB regarding this issue. They are now working on governors' emails to OMB. They are continuing to work, but time is getting short.
- Larry Stevens asked how the DOI Secretary values this program. Andrea responded that he values it very highly. Andrea has been in the field meeting with people on this issue. Brent added that Reclamation Commissioner Brenda Burman knows about this system and this program. He reported having presented on the program to WAPA's OMB examiner. People at the highest level of the department are engaged in a solution, as are those from the seven basin states. The two recovery programs carry a lot of influence and GCDAMP is riding on that influence, as well.

- Leslie James said, to Dave Nimkin's question, there is a letter coming out today signed by the Nature Conservancy, CREDA, and the Family Farm Alliance, and as Steve Wolf said there has been a broad base of support for funding these programs. This is a complex funding issue, and if appropriated funds are used, the issue of scoring will arise which increases uncertainty. She said that, according to the authorizing legislation for this program, Congress has stated that other sources of funding could be used. If people are looking for how they can help, they can help with lobbying.
- John Jordan asked how close the GCDAMP is to the drop-dead date for stopping work if the funding issue is not resolved. Brent responded that it would not be a hard stop at the end of FY18. Reclamation has access to unexpended funds that will allow some work to continue. There are emergency funds for fish programs that can be tapped into to buy some time. Scott VanderKooi added that GCMRC is looking at a range of months after October 1 that it can still continue to operate. GCMRC is working with USGS and Reclamation to look for funding. Brent added that there are funds from other programs that aren't expended and can be reallocated, though those funds are in competition with other programs in need. Reclamation's budget is about \$175 million and only about 95% of it is spent each year.
- Steve Wolff commented that these programs and funding are important for people in this room.
- John McClow requested more details on the legislative approach. Andrea responded that HR4465 has a small piece related to the funding, and that Senator Orrin Hatch is working on the issue in the Senate. Steve Wolff added that Senator Hatch added an amendment to the Water Resources Development Act (WRDA) bill directing money to be sent to Reclamation. The Appropriations Committee is also supportive of adding funds for this purpose.
- John McClow recalled that Commissioner Burman had discussed the funding issue with OMB, and wondered if AMWG could elevate this to the level of the DOI. Andrea noted there is a leadership team working on this, and that her being here is elevating it to the level of the Secretary.
- John Hamill asked OMB's rationale for this new guidance and whether the Secretary had been consulted on this decision. Brent noted that Reclamation has not heard of a rationale and that DOI was not consulted on this decision.
- Rose Houk asked how the GCPA factored into this decision. Brent clarified that there are numerous authorizations that factor in, including recovery needs, the ESA, and the GCPA. There is some range to how Reclamation can fund these programs. It was clear in the GCPA authorizations that power revenue funding could be used for this, as it has been for many years. Reclamation plans to use and stay within other authorities and legislation to build a bridge over the gap created by this lack of funds.
- Kelly Burke asked how other individuals and groups could get involved in the process. Steve Wolff suggested phone calls to congressional delegations, and noted that there has been coordination between upper and lower basin states to lobby these delegations and others for funding. Leslie also clarified that there has been direct outreach to the OMB asking them to reverse this guidance, and OMB has stood by their directive and not responded.
- Matt Kaplinski asked for clarification on whether the congressional fix was to restore reimbursable funds or to add appropriated funds. Steve Wolff stated that both are options; however, in his view the best fix would be for OMB to rescind their directive and reapply the funds. All proposed congressional fixes come with complicating issues.
- John Hamill asked how the FWS plans to respond to the lack of funding for these programs, which pay for ESA compliance. Laurel Barnhill stated FWS is available to aid agencies with consultation and is sensitive to what these cuts mean.
- Lynn Hamilton stated that she was heartened that so many groups and individuals were fighting to restore funding but could not believe that OMB would make a decision like this for

an established program with much success and many stakeholders invested in that success. She emphasized the importance of the science produced by this group.

Larry Stevens indicated his intention to introduce a motion with a recommendation to the Secretary regarding this issue. Mary requested that he email the motion for consideration later today. Andrea thanked the group for their feedback.

AMWG Goals

Presenters & Affiliation: Andrea Travnicek, Deputy Assistant Secretary of the Interior for Water and Science and Secretary's Designee Alternate; Katrina Grantz, Chief, Adaptive Management Group, Bureau of Reclamation

Presentation Summary

During the last AMWG meeting, a question arose regarding DOI guidance on AMWG's goals. The objectives and goals for AMWG are laid out in the LTEMP. The goals are designed to adapt to the issues that arise and change over time. For example, the group recently addressed perceived changes in a BT population increase, potentially as a result of fall HFEs, with a workshop and subsequent scientific paper. The documents for this guidance include the LTEMP and myriad other documents, some of which are becoming outdated. DOI will solicit input from AMWG on streamlining these guidance documents, as well as for developing monitoring metrics for success in meeting the AMWG goals. DOI wants to explicitly specify how resource goals will be monitored. Additional details on this presentation are in [Attachment 3](#).

Discussion/Q & A

- David Nimkin stated that he has reviewed some of the old documents on the AMWG website, including desired future conditions. He asked whether this was incorporated into the LTEMP. Katrina clarified that older documents and goals were incorporated into the LTEMP.
- Mike Yeatts asked for clarification on the relationship between monitoring metrics to be developed for LTEMP and the metrics of the desired future conditions. Katrina said that there are nuances between the two. Desired future conditions were developed prior to LTEMP, and then incorporated into the LTEMP but the goals of the LTEMP were slightly different than the desired future conditions. The goals of the LTEMP and the metrics by which we target success and the direction we want to move are clearly identified in the EIS and ROD. There is a range for some of the goals to determine if we have reached success. We need to check what those ranges are and where the gaps are within those. We used modeling metrics in the EIS because the effects analysis was based on modeling; now we need to develop monitoring metrics that use data gathered in the field. Some of the monitoring metrics may be the same as the modeling metrics.
- Jayne Harkins commented that Mike's question highlighted confusion within the AMWG. She stated that when the AMWG discussed desired future conditions, the group thought that they would be able to quantitatively define success for each resource. Then the LTEMP EIS interrupted that progress. The group is now not on the same page as to what success is and how we will get there. She would like to determine what, quantitatively, success is; and added that monitoring metrics are different from that. She asked if the monitoring metrics would be qualitative or quantitative. Katrina stated that monitoring will be quantitative, but the metric for success still needs to be determined internally. There is not yet an answer. Jayne emphasized that more precise instruction and clarification is needed.
- Melinda Arviso-Ciocco mentioned that she remembered previous conversations on metrics and requested additional information on how goals number 1 (archaeological and cultural resources) and 8 (Tribal resources) overlap. The resources do overlap for Tribes. Katrina

explained that as written in the ROD, archaeological and cultural resources are included as valued to peoples other than Tribes as well, whereas Tribal resources are broader and include other resources within the canyon. The metric for success for Tribal resource goals in particular is difficult to determine. Melinda noted that in the Tribes' opinion, all of the resources are Tribal and cultural resources, all within the same area. Katrina stated that Reclamation is aware of this, and having a section in the EIS specifically for Tribal resources allowed Tribes to specifically say what determines success for them.

- John Jordan said that this will be a long process. What comes out of this will be what we work with, and we get rid of the other older documents. It's a daunting task.
- Larry Stevens noted that in the beginning of producing the 20-year LTEMP, the group acknowledged it would not be easy. The list of topics started with individual resources, but now we are trying to understand the resources at an ecosystem scale. The resources and the interactions among resources are not well understood. How does Reclamation plan to address both policy and technical aspects of success? Katrina responded that DOI, with input from members of AMWG, would determine the guiding documents. For the metrics, Katrina had initially thought that soliciting input from TWG and GCMRC would be sufficient. Larry's comments on guidance suggest that there may need to be policy input as well. It is not yet set in stone from a project management standpoint.
- Seth Shanahan asked if there was additional specificity about TWG's involvement. TWG has an appetite to help, but doesn't have enough direction. Katrina advised that she is still looking into what the ROD says about the role of TWG in this effort. It might be helpful if the AMWG spoke up about how TWG should participate, as AMWG also directs the work of TWG.

Basin Hydrology and Dam Operations

Presenter & Affiliation: Heather Patno, Hydraulic Engineer, Bureau of Reclamation

Presentation Summary

Basin hydrology operations are in the upper elevation balancing tier, with a projected 9 million acre-feet (maf) of water to be released from Lake Powell this year. Storage in the system is very low, with Lake Powell elevation 6.52 feet above the threshold for triggering balancing operations for releases between 8.23 and 9 maf. The forecast conditions for future years show that all basin storage will be below average. Additional details on this presentation are in [Attachment 4](#).

Discussion/Q & A

- Steve Wolff requested that Reclamation include the lines for the 24-Month Study exhibit run projected elevations on the Lake Powell end of month elevation diagram.
- Ted Rampton wondered why there was a drastic drop in releases from Glen Canyon on August 12. Heather clarified this was because of problems with the transmission grid. Steve Johnson added that there was a lightning strike that took out part of the grid and that required testing before the system was brought back online.
- Larry Stevens requested a two-year outlook for the maintenance schedule to be presented at the next AMWG meeting. This might assist in planning for a springtime HFE that wouldn't interfere with planned maintenance. Heather stated this could be possible; she also noted that the schedules often change.

Recommendation to the Secretary Regarding Hydropower Funding for the GCDAMP

Presentation Summary

This item was not on the agenda and was included in the meeting as a response to Larry Stevens' intention to introduce a motion to send a recommendation to the Secretary regarding the FY19

AMWG funding issues. Mary Orton reminded AMWG members that in order to entertain a motion that was not identified by a deadline before the meeting, the AMWG would first need to approve a motion to consider that motion.

John Jordan moved and John McClow seconded a motion to consider the motion to address the FY19 funding issue.

Discussion/Q & A

- Chip Lewis asked if this process was necessary. He doesn't want to appear to impugn the actions that have already been taken to restore funding. Andrea Travnicek stated that while she has a direct line to the Secretary to communicate AMWG's concerns, this is an opportunity for AMWG to be heard. It will be quicker for Andrea to take the concerns back tomorrow. Katrina added that by putting a motion to the Secretary, AMWG would be logging the action in the official FACA database.
- It was confirmed that this would not be considered lobbying by DOI agencies as the DOI representatives on AMWG are non-voting.

After discussion, the motion was approved by consensus, with Steve Johnson (WAPA) abstaining.*

Presentation Summary

Larry Stevens moved and Mike Yeatts seconded the following motion, which was put together by several stakeholders: "The AMWG has worked assiduously for the past 20 years to provide the Secretary of the Interior with the best advice on operating Glen Canyon Dam consistent with the Grand Canyon Protection Act of 1992. The Glen Canyon Dam Adaptive Management Work Group (AMWG) recommends that the Secretary work with Office of Management and Budget to determine appropriate funding to support the Glen Canyon Dam Adaptive Management Program, the AMWG, and other critically important programs in the Upper Colorado River Basin."

After discussion and editing by the group, the following motion was approved by consensus with Steve Johnson abstaining*: "The Glen Canyon Dam Adaptive Management Work Group (AMWG) has worked assiduously for the past 20 years to provide the Secretary of the Interior with the best advice on operating Glen Canyon Dam consistent with the Grand Canyon Protection Act of 1992 and is concerned about the redirection of Colorado River Storage Project revenues. The AMWG recommends that the Secretary continue to communicate to the Office of Management and Budget AMWG's concerns about adequate funding for the Glen Canyon Dam Adaptive Management Program and other critically important programs in the Upper Colorado River Basin consistent with Congressional authorizations."

* While DOI bureau representatives are members of the AMWG, they do not have a vote.

Evaluation of Temperature Control Methods at Glen Canyon Dam

Presenter & Affiliation: Marianne Crawford, Biologist, Bureau of Reclamation

Presentation Summary

The LTEMP BO directs Reclamation to explore the efficacy of a temperature control device at the dam to respond to potential extremes in hydrological conditions due to climate conditions that could result in nonnative fish establishment. Reclamations' Technical Services Division is currently evaluating all current and evolving technological advances in temperature control

devices and will provide the document to AMWG members when it is available. This study will inform a competitive solicitation for new and innovative ideas from the public. Any new technologies identified will be included in feasibility studies.

Reclamation has also been modeling water temperatures changes that may occur as a result of using the bypass tubes at Glen Canyon Dam. Details of the presentation are found in [Attachment 5](#).

Discussion/Q & A

There were no questions or discussion.

Update on the Progress of the Bug Flow Experiment

Presenters & Affiliation: Ted Kennedy, Aquatic Biologist and Jeff Muehlbauer, Research Biologist, Grand Canyon Monitoring and Research Center

Presentation Summary

Previous studies by GCMRC demonstrated that fish populations in the CRE were food-limited: there were not enough bugs to feed the fish. Studies showed that the foodbase was unstable and lacked diversity. This is not usual for rivers, and is historically not the case for the Colorado River. As a result, the fish growth is not good. The load following dam operations result in an artificial daily intertidal zone which constrains production of midges, an important food base for fishes.

The bug flows were designed to give midges two days per week (on the weekends) of ideal conditions for egg laying: steady flows so eggs stay wet. This experiment appears to be increasing insect abundance in the river system. Over time, GCMRC hopes to see more bugs, stabilized bug abundance, and more insect diversity. GCMRC hopes to start seeing a full response by next spring. Anecdotal evidence from river guides and anglers showed that the river seems more “buggy” already on weekends. There appears to have been a large emergence event as a result of the bug flows. GCMRC thinks that not only are the eggs surviving at a higher rate, but more bugs may be choosing to lay eggs as well. Details of the presentation are found in [Attachment 6](#).

Discussion/Q & A

- Leslie James asked why the Glen Canyon Dam load following was creating this issue when this problem isn't observed in rivers from other dams. Jeff stated the same problems do occur in other rivers that have flows from hydroelectric dams.
- Leslie asked if it was the volume of the water released or the rate at which the water was released that was more impactful to insect population. Scott clarified that GCMRC does see that flow—the elevation change of about a foot over the course of a day—matters for insect abundance. GCMRC has not examined the impacts of volumes of water as thoroughly and cannot clarify the impacts as well.
- Peter Bungart asked when is the prime date range for bug flows. Jeff answered that for midges, the peak laying season is from May to July.

Do Bug Flows Result in Better Fishing?

Presenters & Affiliation: David Rogowski, PhD, Colorado River Fisheries Biologist, Arizona Game and Fish Department; John Hamill and John Jordan, Trout Unlimited and Fly Fishers International

Presentation Summary

Dave Rogowski defined improved fishing as increasing the number and/or size of fish caught. AGFD used data from ongoing creel surveys (angler surveys), using only data from boat fishermen, to determine if fishing has been better due to bug flows. Preliminary study results show that fishing has improved (catch per unit effort has increased), potentially due to change in fish behavior as a result of more food, or gaps in food abundance, making fish more likely to be attracted to a lure.

John Hamill stated he accompanied researchers on a bug flow monitoring trip and observed how much work goes into this process. He has also spoken to fishing guides who say bug flows are making the quality of fishing better: more fish are caught and the condition of the fish is better. Anglers hope these bug flows continue and that the fishing trends continue. This has been a boon to the Lees Ferry fishery. John Hamill sees that these bug flows could benefit the whole riparian zone and thinks the bug flows should continue for several years. Details of the presentation are found in [Attachment 7](#).

Discussion/Q & A

- Rob Trathnigg asked what an interruption in data collection would mean. Dave answered that long-term monitoring is a gauge of what the fishing experience is, what people think of the fishery, and what the economic impacts are. It's an inexpensive monitoring method.

FY 2019 Budget and Work Plan

Presenters & Affiliation: Seth Shanahan, Technical Work Group (TWG) Chair; Katrina Grantz, Chief, Adaptive Management Group, Upper Colorado Region, Bureau of Reclamation; and Scott VanderKooi, Chief, Grand Canyon Monitoring and Research Center

Presentation Summary

Seth said that the TWG recommended the budget to AMWG by consensus with one abstention from Steve Johnson. TWG discussed the trout management flows and funding for bug flows to make sure that it was in place. They discussed several projects that were started at the beginning of the TWP and then were discontinued, with the result that some projects received additional funding. NPS asked TWG to recommend funding a nonnative fish harvest if it were indicated at the conclusion of the NPS Nonnative Fish EA.

Katrina reviewed the Reclamation budget as presented on slides 6-13 of the presentation referenced below. The only proposed change from the three-year budget that was recommended last year was the CPI. While Reclamation assumed a 1% CPI for all years in the workplan, the actual 2018 CPI was 2.2%. Therefore, there was a small amount more money available in 2018, and the budget numbers for FY 2019 have been adjusted accordingly. The total funding for GCDAMP in 2019 is estimated to be \$11,268,013. Reclamation would receive \$2,253,603 of that, and GCMRC would receive \$9,014,410. The Native Fish Conservation fund is anticipated to hold approximately \$1.8 million at the end of FY18. This is where intentionally unused dollars are placed each year to be used at a later date for emergency native fish conservation actions. The program may be able to use these funds if there is a FY19 funding gap. Katrina also noted that Reclamation started a NHPA mitigation contingency fund, which is estimated to have \$29,000 by the end of FY18. Reclamation anticipates adding \$30,000 per year to this fund to be used in the event of necessary NHPA mitigation actions in the future.

Scott presented the GCMRC budget, and noted that the scope is the same as presented at the May 22, 2018 webinar. He reviewed the projects detailed in slides 15-26 of the presentation

referenced below. Scott noted that Project E, “Nutrients and Temperatures as Ecosystem Drivers,” is a new project looking at the link between nutrient abundance and water temperature.

USGS is postponing signing a new lease on updated facilities until the FY19 budget is resolved. There would be an increase to about 15.5% in overhead funds once GCMRC is in the new building, roughly in mid- to late 2020. GCMRC revised its initially proposed budget, given their reduced projected overhead rate and increased CPI. This eliminated GCMRC’s need for extra funds to balance its budget. GCMRC was able to increase salaries as well as fund cooperative agreements with AGFD and FWS. GCMRC added a spring monitoring trip and a project to design potential trout management flows. Details of the presentation are found in [Attachment 8](#).

Discussion/Q & A

- John Jordan asked if there was money in the budget for continued bug flow experiments. Scott VanderKooi stated that GCMRC did request additional money from the experimental fund, as initially GCMRC thought this would be a one-year study. At this time, GCMRC does not anticipate needing additional funds, however they may want to redesign the study to further look at differences between week and weekend flows. Katrina added that there is enough in the experimental fund set aside for bug flows.
- John Jordan asked if it was still within the Reclamation budget to continue studying temperature control devices. Katrina clarified that the study was funded in order to comply with the BO. Doing a feasibility study, however would be a much larger project.
- Leslie James noted that she had asked Steve Johnson what the estimated cost of the bug flows was to hydropower. Although the total cost cannot be reported until the end of the bug flow experiments, WAPA estimates the cost to be about \$330,000 for the four-month season.

Chris Cantrell moved, and John McClow seconded the following motion: AMWG recommends to the Secretary of Interior his approval of the GCDAMP Fiscal Year 2019 budget as described in the attached budget tables dated May 18, 2018 from the Bureau of Reclamation and June 22, 2018 from the Grand Canyon Monitoring and Research Center as revised by the TWG on June 25, 2018. The motion was approved by consensus, with Steve Johnson abstaining.*

* While DOI bureau representatives are members of the AMWG, they do not have a vote. Steve Johnson (WAP), abstained.

Spring High Flow Experiments (HFEs) Planning

Presenters & Affiliation: Andrea Travnicek, Deputy Assistant Secretary of the Interior for Water and Science and Secretary’s Designee Alternate; Katrina Grantz, Chief, Adaptive Management Group, Bureau of Reclamation; Scott VanderKooi, Chief, Grand Canyon Monitoring and Research Center

Presentation Summary

Per an action item from the last meeting, DOI was tasked with identifying any flexibility in the LTEMP ROD to allow a spring HFE. Katrina reviewed the HFE decision process as laid out in the LTEMP. Katrina and Andrea indicated that there is some flexibility in the LTEMP ROD to explore spring HFEs, but not in lieu of fall HFEs. The flexibility is also limited to the decision-making process once a sand accounting threshold is met, and in determining which future sand estimate to use once the accounting period is over. However, this decisional flexibility must be backed by science. Overall, the decision to have an HFE is dependent on whether there is enough sediment to warrant an HFE, and if the HFE will cause damage to resources. The

presentation and discussion resulted in a preliminary reading of a motion to initiate a spring HFE experiment. The details of this presentation are in [Attachment 9](#).

Discussion/Q & A

- Larry Stevens commented that the river should be managed for natural conditions, but that AMWG has administrative constraints to doing so. The flexibility is good, but Larry is still concerned about the decision process for spring HFEs. His concern is that, within the LTEMP, AMWG will not have an opportunity to test a springtime HFE and then look at impacts of fall HFEs on resources, resulting in AMWG not having enough information to design the next 20-year management plan. Larry asked if an experiment could be conducted under the LTEMP. Katrina responded that if a fall HFE is predicted to cause harm, it's within Reclamation's purview to not recommend a fall HFE. She added that the LTEMP was designed to manage sediment resources, and the purpose of an HFE is sediment conservation. Katrina asked for clarification as to whether or not Larry is asking for an HFE that is not based on consideration of sediment.
- Katrina said that there are opportunities to do spring HFEs within the context of LTEMP. Rod Smith restated that the options presented for considering a spring HFE are all that AMWG has right now. To do something more would require a change to the LTEMP. Without doing that, AMWG needs to work within the constraints while still being adaptive.
- Dave Brown commented that he did not see any alternatives analyzing different accounting period dates. He also commented that NEPA requirements are not a reason not to look at different options. NEPA compliance can be streamlined under new guidelines and should not constrain the group's thinking.
- John Jordan said that the spring HFE issue has been discussed for many years. This is a sediment-driven project, but there are resource concerns down the river. AMWG keeps hearing about obstacles to having a spring HFE, but nothing changes. John stated he is interested in knowing how to fix this to adaptively manage this program to improve resources. He wants to know what the minimum is to manage resources and not just sediment.
- Rod clarified that prior to looking to fix a problem the group needs to decide what it wants, then the conversation would turn to the compliance process. The group needs to decide if the LTEMP is not working, what would work? John Jordan supported this as a meaningful plan. Steve Wolff backed John Jordan's comments and supported developing an adaptive plan.
- John Hamill responded that the motion he and John Jordan proposed on the agenda for tomorrow has a request for a workshop to determine the consequences of fall HFEs over the last ten years. The goal of a workshop would be to review that question and then, from a scientific standpoint, determine what to do differently. Any changes could be simply addressed with an EA.
- Chris Lehnertz stated that LTEMP is less than two years old and NPS does not see what is broken. She asked whether there are issues that need to be fixed, and if so, is there enough information to know the impacts. NPS feels that the LTEMP is a good guiding document and it should be given a chance to work.
- Andrea requested clarification for what AMWG wants to see happen – what does AMWG want fixed, how would it get fixed, can the fix be accomplished with the guiding documents AMWG currently has? Are there enough resources to accomplish this?
- Larry Stevens clarified that his initial request was to have a spring HFE. The broken piece is that the fall HFEs have possibly resulted in more nonnative fish showing up and causing threats. Larry supports the idea of a symposium. His concern is that it takes a long time to design and plan an experiment. By learning from a spring HFE now, AMWG could influence the next 20 years of LTEMP. Larry stated that the likelihood of having a spring HFE triggered by sediment is almost nonexistent. Because of this, AMWG could lose the opportunity to learn and could be harming the system without knowing. A well-planned experiment, a springtime

HFE of a given duration and volume, needs to be developed starting now, ideally designed for when the river used to flood naturally.

- Chris Lehnertz countered that there are other bodies of science yet to be published on resources in the river, including the NPS' Nonnative Fish EA.
- Kirk Young stated that if there is creative flexibility in sand accounting for scheduling a spring HFE, then AMWG should try that and additional NEPA is not necessary.
- Leslie James commented that she is concerned that there is not as much flexibility in the LTEMP ROD for experimentation as she initially thought. The LTEMP ROD was designed to allow for learning and adapting to better manage resources. If there are limitations on this, that may be what's broken in the ROD. She asked if the group is taking advantage of the flexibility that does exist. Rod Smith clarified that the HFEs are constrained due to water and power capacities. Below the limits of water and power, there is more flexibility for experimentation. Katrina added that there are operational constraints, but within those constraints there is flexibility every day to make sure electricity is produced. Leslie James stated she was satisfied that enough flexibility exists, as she thought.
- John McClow agreed with NPS that there is a framework within the LTEMP for HFEs, and said Colorado would prefer to stay within the program and not spend limited resources on a workshop and study for spring HFEs. A lot of time was put in to planning the HFE triggers, but if in fact those triggers aren't adequate, AMWG needs to plan for different criteria.
- Mike Yeatts pointed out that in designing the criteria for determining HFEs, LTEMP assumed a certain number of spring HFEs would be triggered. If the science shows that conditions would not in fact ever trigger a spring HFE, then that might be worth reconsidering.
- Steve Wolff asked if there was scientific value in doing a spring flow event. Scott VanderKooi stated that scientifically there is good reason to do a spring flow event, but the exact details would need to be figured out. Having the comparison would be interesting.
- Josh Korman said that he sees three instances where the science was either new or emerging at the creation of the LTEMP, which may lead to an inconsistency between the science and the protocol. The first is that by leaving sediment on the bed over the fall you could reduce trout growth in Marble Canyon and could reduce trout in the LCR, so during years where there are trout by the LCR, it should be a consideration for a fall HFE. Second, when there are volumes at about 9 maf, sediment can remain until the spring. The sediment accounting window can be changed to accumulate sand over the fall and be used in spring accounting. This was shown in 2005-2008, where there is empirical evidence of multi-year accumulation. Finally, while the increased trout response to the 2008 spring HFE was predicted, it could have been caused by a non-HFE factor. It's not clear from the evidence that HFEs are bad. It is known that nutrients are playing an important role. Before, a nutrient impact may have been mistaken for an HFE impact. LTEMP is not consistent with these last two pieces.
- Larry Stevens added that this is the beginning of the LTEMP process, and as such there is plenty of time to plan for an experiment if a spring HFE is triggered. If AMWG doesn't start thinking about it now, however, and a spring HFE is triggered, then there will be no experimental plan in place. John McClow said he could support planning for an experiment. Katrina reminded the group that the process for determining if a spring HFE is needed is the same as for a fall HFE, and that monitoring always occurs during HFEs. Larry agreed that the monitoring is informative, but that additional detail and changes to the structure of monitoring might warrant additional thought. Scott VanderKooi added that monitoring methods are evolving and that considering additional monitoring tools may be a good idea, but that the entire monitoring program doesn't need to be reinvented for an experiment.
- Kirk Young said the group could start talking about the range, dimension, and size of spring flows that might be helpful, then check in with the scientists, and see if the flexibility already exists to do this. If it doesn't, then we need to look at how to find that flexibility. John Hamill suggested that this would be a desired outcome of the proposed workshop.

- Andrea suggested that first the group needs to figure out what it wants. Steve Wolff would like scientists to look at what flow events they learn from within the LTEMP. Mary suggested that interested parties meet this evening to discuss how to move forward, and they agreed. The Hualapai Tribe stated they would like to be part of the discussion to determine impacts to recreation.

Lees Ferry Rainbow Trout Stocking Update

Presenter & Affiliation: Jim deVos, Assistant Director, Wildlife Management Division, Arizona Game and Fish Department

Presentation Summary

The AZGFD is seeking to maintain a world class trout fishery in Lees Ferry. The fishery is economically and socially beneficial and impacts the local community. AGFD is still on track to implement stocking trout as initially proposed, with 16,000 triploid trout stocked from April to October with no more than 2,000 fish stocked at a time. The BO has been developed. The FWS is still in the NHPA Section 106 consultation process with the Pueblo of Zuni, the Hopi Tribe, and the Navajo Nation. An MOA is being developed. The Pueblo of Zuni Tribe's position is that the impacts from this proposed action cannot be mitigated.

Discussion/Q & A

- No discussion or questions followed.

Public Comment

There were no public comments.

End of Day 1 meeting.

Thursday, August 23, 2018

Start Time: 8:30 am

Conducting: Dr. Timothy Petty, Assistant Secretary of the Interior – Water and Science, and Secretary’s Designee (morning); Brent Rhees, Bureau of Reclamation Upper Colorado Regional Director and AMWG Designated Federal officer (afternoon)

Facilitator: Mary Orton, The Mary Orton Company, LLC

Recorder: Lauren Johnston, The Mary Orton Company, LLC

Dr. Tim Petty introduced himself as the Secretary’s Designee and Assistant Secretary of the Department of the Interior—Water and Science. He said he had served as Deputy Assistant Secretary—Water and Science 2006-2009 and so was familiar with the GCDAMP. He is a groundwater hydrologist and has a PhD in surface flow hydrology. He thanked AMWG members and other attendees for their attention to and concern for the important issues being addressed by the AMWG.

Basin Fund and Revenue Overview

Presenters & Affiliation: Steve Johnson, Senior Vice President and Colorado River Storage Project Manager, Western Area Power Administration; Brian Sadler, Administrative and Technical Services Manager, Western Area Power Administration

Presentation Summary

Steve Johnson presented basin fund obligations and funding mechanisms to manage the Colorado River Storage Project (CRSP) monies. WAPA anticipates that regional transmission organizations will replace separate balancing authorities to better manage electricity generation and load. This will help manage risk. Unexpected costs have placed the Basin Fund at a balance of \$110 million, when \$198 million was planned. WAPA estimates the cost of the bug flow experiment to be \$335,000. The details of this presentation are in [Attachment 10](#).

Discussion/Q & A

- John Jordan asked what are the factors that determine or limit rate setting for customers, and what is the approval process once that rate is determined? Brian Sadler answered that rate setting is a public process that WAPA undertakes every five years. WAPA starts the process one year early. A primary component is purchase power. (Purchase power is power that Western must buy from other suppliers when they do not have enough Federal generation available to meet their contract commitments.) WAPA projects out ten years to determine what purchase power they have and how it will impact their resources. Purchase power has an immediate impact on the Basin Fund. Steve Johnson added that the rate determination process is noticed in the Federal Register. Leslie James added that after public comment and revisions, etc., the rate recommendation gets sent to the DOE and then to FERC for an additional review process.
- Chris Lehnertz asked how WAPA went about balancing the needs to keep the budget reasonable but also to address risk. Steve answered that they come up with a formula to justify their request, and that it is a complicated process.
- David Nimkin asked the duration of UAMPS and CREDA customers’ contracts. Leslie James replied that the contracts for SLC integrated projects are long-term firm electric service contracts. WAPA writes contracts for 40 years, but these are not fixed price contracts. WAPA can change the rates, and then customers make determinations if they can fulfill contracts at those rates. The current rate expires in 2020.

- Kirk Young wondered if WAPA is experiencing the same strain as the Bonneville Power Authority in Oregon. Steve answered that each area is unique, and that Bonneville made some decisions that caused their financial troubles.
- Larry Stevens asked if there is an international component to competitive pricing. Brian answered that there is interplay between US and British Columbia/Alberta markets, but it does not have a big impact in the West.
- Mary Orton inquired about the amount of revenue the Glen Canyon Dam generated in the past year. Steve answered that this is difficult to calculate for just Glen Canyon, but it's between 70-80% of the total system generation of roughly \$180 million/year.

Joint Tribal Liaison Report

Presenters & Affiliation: Theresa Pasqual, Joint Tribal Liaison for the Glen Canyon Dam Adaptive Management Program, DOI/OWS; Sarah Rinkevich, Joint Tribal Liaison for the Glen Canyon Dam Adaptive Management Program, DOI

Presentation Summary

The Joint Tribal Liaisons agree that monthly phone calls since last November with federal agencies involved in AMWG have improved communication and understanding of issues. Sarah and Theresa have a standing call with Andrea Travnicek and the chief of staff, and both attend TWG meetings. Sarah and Theresa identified a need to have more tribal representatives at the TWG and GCDAMP meetings and will work more diligently to get tribal issues on the agendas, schedule river trips, etc. At the pre-AMWG meeting, tribal representatives discussed the NPS EA, issues with the trout stocking proposal, and an MOU to address future nonnative species removal.

Tribes appreciated the good conversation over lunch yesterday with Andrea, and want to continue increasing communication. Tribes appreciate being involved early with the LTEMP process and continued discussions with GCMRC and the NPS in preparing experiments and assessments. Tribal representatives will have a voice in shaping the Tribal HPP. This is important to ensure tribal voices are heard. Cultural sensitivity training will have lasting impacts for Tribes. The work being undertaken to incorporate Tribal points of view in the NPS vegetation study is much appreciated. Tribes are thankful other groups are reaching out to understand Tribal perspective and worldviews. Tribes still face challenges in remaining sustainable and responding to public access demands.

Discussion/Q & A

- Larry Stevens informed the group that there is currently an exhibit on tribal voices at the Museum of Northern Arizona.
- Brent Rhees complimented everyone's work on the monthly calls and recommended that they continue.
- Sarah Rinkevich stated she appreciates NPS having Tribes at the table from the beginning and anticipates their efforts will be successful.
- Melinda Arviso-Ciocco requested clarification on what the group meant by "increased tribal participation." Is this from a cultural perspective or a scientific perspective? How, at the DOI level, are Tribal participation and Tribes themselves viewed overall? Being that Tim Petty is not even from the Southwest or involved in the Tribal communities, how are Tribes viewed at your level? Tim Petty answered saying he worked for nine years in the Northwest for Senator Risch and dealt regularly with Tribal issues. These issues are important to him. While working with Commissioner Burman he had many discussions about Tribal issues. He stated he has met with many Tribes to discuss various issues, and is involved in the drought contingency

plan. Tim said he looks forward to meeting with Melinda and with other Tribal representatives and hearing about Tribal priorities.

- Sarah reiterated that she would work harder to get Tribal representatives at TWG meetings and on TWG agendas. There was a successful Tribal presentation at the Brown Trout workshop, and she would like to see more.
- Steve Johnson noted that there was an upcoming ceremony for completion of the first-ever large-scale solar farm on the Navajo Nation in Kayenta, which will double power generation for the Nation. WAPA is developing a vision for post-coal generation for the Navajo Nation.

Science Advisors' 2018 Work Plan

Presenter & Affiliation: David Braun, Executive Coordinator, GCDAMP Science Advisors

Presentation Summary

The FY18-20 workplan for the Science Advisors includes a three-year knowledge assessment, a standing expert panel, independent review panels as needed, and an executive coordinator, all for \$150,000 + CPI. The knowledge assessment is proposed to start in FY19. The independent expert panel hiring has been suspended due to contracting issues. The Science Advisors completed independent document reviews of the NPS Nonnative Fish Environmental Assessment (EA) and GCMRC's brown trout report. Reclamation and AMWG can request additional independent review panels as needed. The details of this presentation are in [Attachment 11](#).

Discussion/Q & A

- Larry Stevens stated the role of the independent review team is critical for this process. Larry emphasized that he supports independent review and thinks that external critique is critical. He asked if David has enough support from AMWG for his important work. Katrina clarified that the suspension of work was due to contracting issues. The IDIQ has reached its ceiling and hasn't yet been renewed. Reclamation did not want to have David start work that they could not pay him to finish. It is difficult to write a contract for the science advisors program as it requires both specificity and flexibility. Reclamation also does not want to rush the identification of a three-year review panel. Reclamation understands the importance of independent review and is pleased with David's work. Reclamation supports the need for an independent scientific review panel. David agreed that Reclamation was not wavering from supporting the independent review panel.
- Katrina added that Reclamation is looking for a meaningful way to integrate Tribal perspectives into this review process.
- David concluded that he hopes the program gets back in place, no matter who is awarded the contract. He noted that the GCMRC also includes intensive peer-review on all of their publications.

NPS Expanded Non-native Aquatic Species Management Plan and Environmental Assessment Update

Presenter & Affiliation: Rob Billerbeck, Colorado River Coordinator, National Park Service

Presentation Summary

NPS is updating their Nonnative Fish Environmental Assessment EA from public comments and tribal consultation, and looking at ways to secure funding for the actions that may be triggered by the EA. The proposed action right now is regarding Brown Trout in Glen Canyon NRA. Details of the proposed action, analysis, and alternatives are included in [Attachment 12](#). The EA

will be published between September 5 - 11, 2018, and open houses are scheduled for late September 2018.

Discussion/Q & A

- David Nimkin asked how quagga mussels were being considered in the EA. Rob replied that the EA is focused from the dam down and quagga mussels are appearing in the dam through some sort of back channel. The river is a sink for the mussels, not a source. NPS is looking at the river as a concern of potential transport, but is not looking at controlling quagga mussels in the river.
- Larry Stevens countered that quagga mussels are already in the river, with counts of 1,000 per square meter at Lees Ferry. The quagga mussel invasion is suspected to be universal. Good communication and education are a tool that can help stop the spread. Larry asked if NPS had considered a reference site or some sort of education plan for visitors who might be carrying the mussels in their wet shoes or clothing. Rob stated that NPS staff has discussed this in the past but does not need to include education programs as part of NEPA compliance.
- Steve Wolff and Chris Cantrell thanked Rob for always being willing to talk on the phone about the EA. AGFD is working hand in hand with Rob's staff to prepare for the Arizona Game and Fish Commission meeting in September. If the EA is released, it will be on the commission agenda. The meeting will be held in Heber, AZ, and available via webinar. Rob thanked AGFD for working so closely with NPS.
- John Jordan pointed out that the non-cooperating agencies to this EA on the AMWG committee have yet to see this document and have not been able yet to share their opinions. John looks forward to seeing the final version. NPS appreciates their future input.
- Larry Stevens noted that catfish don't show up in the monitoring programs, except for angling. He stated that GCMRC doesn't have a great idea of the role that catfish play in the river system. He asked for clarification on how NPS plans to deal with species they don't know much about. Rob said NPS is trying to make the plan as adaptable as possible. There is some flexibility in how to identify specific triggers in the system. There is always the possibility that as more information becomes available, NPS can go back to TWG and AMWG for additional discussion.

Stakeholder's Perspective

Presenter & Affiliation: Christine Lehnertz, Superintendent, Grand Canyon National Park; Billy Shott, Superintendent, Glen Canyon National Recreation Area

Presentation Summary

The Glen Canyon National Recreation Area, Grand Canyon National Park, and Lake Mead National Recreation Area are all units of the National Park Service along the Colorado River. All units of the NPS follow the same guiding principles: primarily conservation, then visitor experience for current and future generations. The many units of the NPS along the Colorado River operate together as a connected park system across administrative boundaries. As with all units of the NPS, Glen Canyon, Grand Canyon, and Lake Mead are looking to address deferred maintenance costs and changes in visitor numbers and access.

The Grand Canyon Protection Act is the guiding reason for NPS' involvement in the AMWG. As written in the Act, the dam should be operated to protect the mission of NPS in these units. NPS is encouraged by the work in the LTEMP to address the responsibilities in the GCPA, and NPS has seen environmental improvements due to AMWG's work. The details of this presentation are in [Attachment 13](#).

Discussion/Q & A

- Chip Lewis asked if there has been any movement towards addressing the deferred maintenance issue. Chris reiterated that the NPS as a whole is realigning priority funds towards maintenance. This includes properties that other companies are managing on behalf of NPS. There is also legislation introduced by Raul Grijalva and Rob Bishop to appropriate \$1 billion per year to reduce the maintenance backlog.
- David Nimkin asked for more information on how NPS was addressing the visitation challenges. Chris stated NPS is looking at social science to better understand the user experience. NPS is exploring the need for reservations for specific attractions, specific parks, etc.
- Melinda stated a Navajo resource enforcement manager had an incident on the Salt Trail regarding a couple and an infant who were not prepared for hiking. There is no formal report from Navajo, but Melinda requested follow up information. The Salt Trail is culturally important to the Navajo and she would like to know how NPS handled that situation. Chris stated she didn't know any specifics about that situation. NPS is sensitive to issues of Tribal sovereignty and of visitors not being prepared. NPS tries to prevent incidents by helping people to prepare or by turning them around. Jan Balsom added that the Salt Trail is on Navajo land so NPS would not have been contacted for an incident there.
- Larry Stevens asked for ways to enhance communication between NPS and GCDAMP. Chris stated there are always opportunities, and Billy Shott offered to further discuss opportunities, especially using the Lake Mead strategic plan as an example.
- John Jordan thanked the current leadership for doing a great job with leadership, access, integration, and involvement.
- Lynn Hamilton asked about NPS efforts along the NPS River Corridors. Chris recounted that NPS did abolish the River District at the Grand Canyon National Park in 2016 after findings of harassment. This year NPS is back using contract operators along the river. River trips are now considered objective-driven missions. NPS has a three-year plan for building up its own river responsibilities and capabilities. NPS will be hiring for river positions next year and will continue using a combination of in-house and contract operators for river missions.
- Lynn asked about NPS capabilities for science and monitoring, to which Chris responded that fisheries missions on the river are a top priority and have been 100% approved. There have been some cultural campsite monitoring and mitigation trips, as well.

GCMRC Science Updates – Part 1

Presenters & Affiliation: Scott VanderKooi, Chief, and Michael Moran, Deputy Chief, Grand Canyon Monitoring and Research Center

Presentation Summary

GCMRC monitors myriad physical aspects of the Colorado River ecosystem over time. GCMRC is using images to assess changes in riparian vegetation. Cooperators at NAU are looking deeper at changes in the riparian vegetation and plant physiology as they relate to the hydrological regime and climate.

GCMRC is modeling how the Glen Canyon Dam is impacting this vegetation. GCMRC is also looking at how dam management is impacting sand conditions and archaeological sites. GCMRC monitors changes in sand dunes in the river system as a result of HFEs.

Finally, GCMRC and cooperators are looking at how water quality and turbidity are impacted by dam operations, and how dam operations impact water quality and other resources

downstream. As part of this water quality study, GCMRC is looking at how phosphorus impacts food resources in the river. To that end, GCMRC asked an independent panel to review water quality and provide recommendations for how to better assess and monitor water quality.

In completing these studies, GCMRC continues to seek input and approval from Tribes for specific activities. The details of this presentation are in [Attachment 14](#).

Discussion/Q & A

- Discussion was delayed until after Part 2 of the GCMRC Science update, presented after the lunch break.

Possible Fall High Flow Experiment

Before beginning the next scheduled session, Katrina Grantz reported that floods on the Paria River over the past few days have resulted in enough sediment in the system to start considering a fall HFE. This doesn't mean that the Department of the Interior will decide to do one, but that the process for determining whether or not a fall HFE is warranted, as outlined in the LTEMP, has now started. The Assistant Secretary for Water and Science will make the final decision by late October, and any HFE would happen the first week of November. Katrina will stay in touch with AMWG members as the decision-making process unfolds.

GCMRC Science Updates – Part 2

Presenters & Affiliation: Scott VanderKooi, Chief, and Michael Moran, Deputy Chief, Grand Canyon Monitoring and Research Center

Presentation Summary

The aquatic food base in the river has increased as the bug flows have been instituted. Final data will be presented at the Annual Reporting Meeting. HBC abundance is still above triggers for implementing management actions outlined in the BO. Spawning probability of HBC is increasing from last year, especially for smaller fish. Condition factor is improving in the smaller fish, allowing for spawning.

At the LCR confluence and in the Western Canyon, GCMRC is catching an increased number of smaller HBC, suggesting that there are more fish recruiting into the population. Overall CPUE for HBC is up, and varies with water temperature. RBT abundance in Glen Canyon appears to be increasing, while BT CPUE is decreasing.

HBC translocations in Bright Angel Creek appear to be successful, with reproduction happening *in situ*.

Increased primary productivity, caused by increased phosphorus, appears to have an impact on the increased condition factor of HBC.

A green sunfish, a striped bass, and a smallmouth bass were all observed in the river system, as were a wild razorback sucker and two flannelmouth/bluehead sucker hybrids. The details of this presentation are in [Attachment 15](#).

Discussion/Q & A

- Kurt Dongoske requested clarification on GCMRC's hypothesis for low trout abundance at the LCR. Scott VanderKooi confirmed that this is a result of the fish migrating out of Glen Canyon, and that the large production events elsewhere force more fish migration. Kurt asked if

stocking fish at Lees Ferry would cause more fish to migrate downstream. Scott answered that he didn't know if fish in Lees Ferry would have that impact. Chris Cantrell stated that there is not a lot of data to support outmigration from Lees Ferry. The natal origins study showed low outmigration numbers. Scott added that during most years there is a small number of fish that migrate, but the fish are usually themselves very small. There are the trickle events and then there are large reproduction events. Scott confirmed GCMRC does see evidence of reproduction occurring out of Marble Canyon, observed during the natal origins study. Chris Cantrell asked and Scott affirmed that the fish reproduction observed in the natal origins study could have happened in Marble Canyon.

- The standard for triggering actions in the BO is measuring populations of HBC in the LCR. John Jordan asked if there was an eventual trend that would lead to the group considering measuring other populations of HBC to determine the health of the species. Kirk Young replied that has been discussed. There is no set number of years that would provide a reason to look elsewhere for a trigger for HBC protections. Kirk hopes that in three to four years, FWS can start to consider that possibility.

Motion for High Flow Experiment (HFE) Workshop

Presenters & Affiliation: John Hamill and John Jordan, AMWG Member and Alternate, Trout Unlimited and Fly Fishers International

Presentation Summary

John Hamill said that there was good discussion last night after the meeting and this afternoon during lunch regarding options to the motion as presented on the AMWG agenda. He reported that he was withdrawing the motion in favor of the following agreement struck by Scott VanderKooi, Larry Stevens, John Hamill, John Jordan, Steve Wolff, and Peter Bungart as an alternative to the motion, if there were no objection:

GCMRC agreed to:

- conduct a scientific assessment of the effects of past experimental high flows (including powerplant capacity flows) at Glen Canyon Dam on high valued resources of concern to the GCDAMP [i.e., recreational beaches, aquatic food base, rainbow trout fishery, hydropower, humpback chub (HBC) and other native fish, and cultural resources]; and
- present initial findings in a written summary at the 2019 Annual Reporting Meeting and the March 2019 AMWG meeting for review and discussion.

A next step would be for GCMRC to identify experimental flow options that would consider high valued resources of concern to the GCDAMP (defined above), fill critical data gaps, and reduce scientific uncertainties.

There was no objection to that path forward. NPS offered to help GCMRC as needed.

Public Comment

Rose Houk commented that the budget cut discussed in yesterday's meeting would impact real people in Flagstaff and surrounding areas. This program is important to the Grand Canyon and to the Colorado River. The important work of this group needs to continue. It's discouraging that the public did not know about this cut until the 11th hour. This should be a public federal budget process. The public should not be kept in the dark.

Brent thanked Rose for her comment and agreed that it is very appropriate to consider people and the impact budget has on people, as well as the river that brings us together, and what a beautiful place this is.

Wrap-Up

Presenter & Affiliation: Brent Rhees, Bureau of Reclamation Upper Colorado Regional Director and AMWG Designated Federal Officer

Brent thanked everyone for their participation and the good meeting that just concluded. He announced the next three AMWG meetings and wished everyone safe travels.

Meeting Adjourned at 3:00 pm

Meeting Attendees—Wednesday, August 22, 2018

AMWG Members and Alternates

Melinda Arviso-Cioccio, Navajo Nation
Jan Balsom, NPS-GRCA
Clifford Barrett, UAMPS (webinar)
Eric Bobelu, Pueblo of Zuni
Carlee Brown, State of Colorado
David Brown, Grand Canyon River Guides
Charley Bullets, Southern Paiute Consortium
Peter Bungart, Hualapai Tribe
Kathleen Callister, Reclamation
Chris Cantrell, AZGFD
Kevin Dahl, NPCA
Kevin Garlick, UAMPS
Jayne Harkins, State of Nevada
Leslie James, CREDA
Steve Johnson, WAPA

John Jordan, IFFF/Trout Unlimited
Vineetha Kartha, State of Arizona (webinar)
Robert King, State of Utah (webinar)
Chris Lehnertz, NPS-GRCA
Chip Lewis, BIA
John McClow, State of Colorado
David Nimkin, NPCA
Daniel Picard, Reclamation
Brent Rhees, Reclamation
Brian Sadler, WAPA
Larry Stevens, Grand Canyon Wildlands Council
Andrea Travnicek, DOI
Steve Wolff, State of Wyoming
Mike Yeatts, The Hopi Tribe
Kirk Young, USFWS

USGS/GCMRC Staff

Clay Allard
Bridget Deemer (webinar)
Mike Dodrill (webinar)
Helen Fairley
Thomas Gushue
Ted Kennedy
David Lytle

Ted Melis (webinar)
Michael Moran
Jeff Muehlbauer
Joel Sankey
David Topping
Scott VanderKooi
David Ward

Bureau of Reclamation Staff

Tara Ashby
Marianne Crawford
Paul Davidson
Marlon Duke (webinar)

Katrina Grantz
Emily Omana Smith
Heather Patno
Christopher Watt
Linda Whetton (webinar)

Interested Persons

Laura Barnhill, USFWS
Rob Billerbeck, NPS
David Braun, Science Advisors
Keith Brekhus, Congressman O'Halleran's Office
Rachel Bryant, WAPA
Kevin Bullets, U of A
Kelly Burke, GCWC
Jeanne Calhoun, NPS-GRCA
Roger Clark, Grand Canyon Trust
Winkie Crook, Hualapai Tribe
James deVos, AZGFD
Kurt Dongoske, Pueblo of Zuni
Sinjin Eberle, American Rivers
Bret Esslin, ADWR
David Gensler, Middle Rio Grande Conservation Dist.
Alisyn Gitlin, Sierra Club
John Hamill, IFFF/Trout Unlimited
Lynn Hamilton, GCRG
Rose Houk, public
Ken Hyde, NPS-GLCA
Matt Kaplinski, public

Anne Marken, Middle Rio Grande Conservation Dist.
Gregory Nelson, Coconino County
Rosana Nesheim, Galileo Project, LLC
Jessica Neuwerth, State of California
Bill Persons, IFFF/Trout Unlimited
Noah Pleshet, U of A
Andre Potochnik, GCRG
Richard Powskey, Hualapai Tribe
Richard Quartaroli, GCRG
Ted Rampton, UAMPS
Sarah Rinkevich, DOI
Peggy Roefer, State of Nevada
Scott Rogers, AGFD
David Rogowski, AGFD
Melissa Sevigny, KNAU
Seth Shanahan, SNWA
William Shott, NPS-GLCA
Rodney Smith, DOI Solicitor's Office
Robert Trathnigg, St. Jude Enterprises
Richard Turner, Grand Canyon Private Boaters Assoc.
David Wegner, Independent

Webinar Attendees

Adam Barkalow
Kerry Christensen, Hualapai Tribe
Craig Ellsworth, WAPA

Heather Hansman
Nadia Ivanova-Pfenning, Coconino County
Josh Korman, Ecometric Research

Ryan Mann, AGFD
Ted Melis, USGS
Michelle Scott
Melissa Trammell, NPS

Jeffrey Woner, K.R. Saline and Associates
C.Y.
Kelly Zanzucchi

Meeting Attendees, Thursday, August 23, 2018

AMWG Members and Alternates

Melinda Arviso-Cioccio, Navajo Nation
Jan Balsom, NPS-GRCA
Clifford Barrett, UAMPS (webinar)
Eric Bobelu, Pueblo of Zuni
Carlee Brown, State of Colorado
David Brown, Grand Canyon River Guides
Charlie Bulletts, Southern Paiute Consortium
Peter Bungart, Hualapai Tribe
Kathleen Callister, Reclamation
Chris Cantrell, AZGFD
Kevin Dahl, NPCA
Kevin Garlick, UAMPS
Jayne Harkins, State of Nevada
Leslie James, CREDA
Steve Johnson, WAPA
John Jordan, IFFF/Trout Unlimited

Robert
King, State of Utah (webinar)
Chris Lehnertz, NPS-GRCA
Chip Lewis, BIA
John McCloy, State of Colorado
Eric Millis, Utah
David Nimkin, NPCA
Tim Petty, DOI
Daniel Picard, Reclamation
Brent Rhees, Reclamation
Brian Sadler, WAPA
Larry Stevens, Grand Canyon Wildlands Council
Steve Wolff, State of Wyoming
Mike Yeatts, The Hopi Tribe
Kirk Young, USFWS

USGS/GCMRC Staff

Helen Fairley
Anya Metcalfe
Michael Moran

Mike Runge (webinar)
David Topping
Scott VanderKooi
Todd Wostowicz

Bureau of Reclamation Staff

Tara Ashby
Marianne Crawford
Marlon Duke (webinar)
Katrina Grantz

Emily Omana-Smith
Heather Patno
Shana Tighi
Christopher Watt

Interested Persons

Laurel Barnhill, USFWS
Rob Billerbeck, NPS
Jan Boyer, AGFD
David Braun, Science Advisors
Rachel Bryant, WAPA
Kevin Bulletts, U of A
Jeanne Calhoun, NPS-GRCA
Roger Clark, Grand Canyon Trust
Winkie Crook, Hualapai Tribe
Sinjin Eberle, American Rivers
Grace Ellis, Galileo Project, LLC
Bret Esslin, ADWR
David Gensler, Middle Rio Grande Conservation Dist.
Ed Gerak, CREDA
Alicyn Gitlin, Sierra Club
Sarah Haas, NPS
Lynn Hamilton, GCRG

Ken Hyde, NPS-GLCA
Anne Marken, Middle Rio Grande Conservation Dist.
Joe Miller, Trout Unlimited
Rosana Nesheim, Galileo Project, LLC
Jessica Neuwerth, State of California
Bill Persons, IFFF/Trout Unlimited
Noah Pleshet, U of A
Ted Rampton, UAMPS
Peggy Roefer, State of Nevada
Scott Rogers, AGFD
David Rogowski, AFGD
Melissa Sevigny, KNAU
William Shott, NPS-GLCA
Rodney Smith, DOI Solicitor's Office
Richard Turner, Grand Canyon Private Boaters Assoc.
David Wegner, Independent
Paulette Yazzie, Congressman O'Halleran's Office

Webinar Attendees

Michelle Adams
Kerry Christensen, Hualapai Tribe
Craig Ellsworth, WAPA
Paul Harms, State of New Mexico
Brian Healy, NPS
Josh Korman, Ecometric Research

Lisa Meyer, WAPA
Maria Santos
Seth Shanahan, SNWA
Melissa Trammell, NPS
Jeffrey Womer, K.R. Saline and Associates

Abbreviations

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|---|--|
| ADWR – Arizona Dept. of Water Resources | FWS – United States Fish & Wildlife Service |
| AF – Acre Feet | FY – Fiscal Year (October 1 – September 30) |
| AGFD – Arizona Game and Fish Department | GCD – Glen Canyon Dam |
| AIF – Agenda Information Form | GCDAMP - Glen Canyon Dam Adaptive Management Program |
| AMP – Adaptive Management Program | GCES – Glen Canyon Environmental Studies |
| AMWG – Adaptive Management Work Group | GCMRC – Grand Canyon Monitoring & Research Center |
| AOP – Annual Operating Plan | GCNP – Grand Canyon National Park |
| ARM – Annual Reporting Meeting | GCNRA – Glen Canyon National Recreation Area |
| ASMR – Age-Structure Mark Recapture | GCPA – Grand Canyon Protection Act |
| ASWS – Assistant Secretary of Water and Science (DOI) | GCRG – Grand Canyon River Guides |
| AZGFD – Arizona Game and Fish Department | GCWC – Grand Canyon Wildlands Council |
| BA – Biological Assessment | GLCA – Glen Canyon National Recreation Area |
| BAHG – Budget Ad Hoc Group | GRCA – Grand Canyon National Park |
| BCOM – Biological Conservation Measure | GSF – Green Sunfish |
| BE – Biological Evaluation | HBC – Humpback Chub (endangered native fish) |
| BHBF – Beach/Habitat-Building Flow | HFE – High Flow Experiment |
| BHMF – Beach/Habitat Maintenance Flow | HMF – Habitat Maintenance Flow |
| BIA – Bureau of Indian Affairs | HPP – Historic Preservation Plan |
| BO – Biological Opinion | IG – Interim Guidelines |
| BOR – Bureau of Reclamation | INs – Information Needs |
| BT – Brown Trout | IFFF – International Federation of Fly Fishers |
| BWP – Budget and Work Plan | KA – Knowledge Assessment (workshop) |
| CAHG – Charter Ad Hoc Group | KAS – Kanab Ambersnail (endangered native snail) |
| CAP – Central Arizona Project | LCR – Little Colorado River |
| CESU – Cooperative Ecosystems Studies Unit | LCRMCP – Lower Colorado River Multi-Species Conservation Program |
| CFMP – Comprehensive Fisheries Management Plan | LTEMP – Long-Term Experimental and Management Plan |
| cfs – cubic feet per second | LTEP – Long Term Experimental Plan |
| CMINS – Core Monitoring Information Needs | MA – Management Action |
| CMP – Core Monitoring Plan | MAF – Million Acre Feet |
| CPI – Consumer Price Index | MATA – Multi-Attribute Trade-Off Analysis |
| CRAHG – Cultural Resources Ad Hoc Group | MLFF – Modified Low Fluctuating Flow |
| CRBC – Colorado River Board of California | MO – Management Objective |
| CRCN – Colorado River Commission of Nevada | MRP – Monitoring and Research Plan |
| CRE – Colorado River Ecosystem | NAU – Northern Arizona University (Flagstaff, AZ) |
| CREDA – Colorado River Energy Distributors Assn. | NEPA – National Environmental Policy Act |
| CRSP – Colorado River Storage Project | NHPA – National Historic Preservation Act |
| CWCB – Colorado Water Conservation Board | NNFC – Non-native Fish Control |
| DAHG – Desired Future Conditions Ad Hoc Group | NOI – Notice of Intent |
| DASA – Data Acquisition, Storage, and Analysis | NPCA – National Parks Conservation Association |
| DBMS – Data Base Management System | NPS – National Park Service |
| DFO – Designated Federal Officer | NRC – National Research Council |
| DOE – Department of Energy | O&M – Operations & Maintenance (Reclamation Funding) |
| DOI – Department of the Interior | PA – Programmatic Agreement |
| DOIFF – Department of the Interior Federal Family | PBR – Paria to Badger Creek Reach |
| EA – Environmental Assessment | PEP – Protocol Evaluation Panel |
| EIS – Environmental Impact Statement | POAHG – Public Outreach Ad Hoc Group |
| ESA – Endangered Species Act | Powerplant Capacity = 31,000 cfs |
| FACA – Federal Advisory Committee Act | |
| FEIS – Final Environmental Impact Statement | |
| FRN – Federal Register Notice | |
| FTE – Full Time Employee | |

Glen Canyon Dam Adaptive Management Program: AMWG Meeting, August 22-23, 2018

R&D – Research and Development
RBT – Rainbow Trout
Reclamation – United States Bureau of Reclamation
RFP – Request for Proposal
RINs – Research Information Needs
ROD Record of Decision
RPA – Reasonable and Prudent Alternative
SA – Science Advisors
SAEC – Science Advisors Executive Coordinator
Secretary – Secretary of the Interior
SCORE – State of the Colorado River Ecosystem
SHPO – State Historic Preservation Office
SOW – Statement of Work
SSQs – Strategic Science Questions
SWCA - Steven W. Carothers Associates

TCD – Temperature Control Device
TCP – Traditional Cultural Property
TEK – Traditional Ecological Knowledge
TES – Threatened and Endangered Species
TMC – Taxa of Management Concern
TMF – Trout Management Flows
TWG – GCDAMP Technical Work Group
UAMPS – Utah Associated Municipal Power Systems
UCRC – Upper Colorado River Commission
UDWR – Utah Division of Water Resources
USFWS – United States Fish & Wildlife Service
USGS – United States Geological Survey
WAPA – Western Area Power Administration
WY – Water Year