

Glen Canyon Dam Technical Work Group Meeting

October 21-22, 2019

Date: October 21, 2019

Start Time: 10:30 am

Conducting: Seth Shanahan, TWG Chair

Meeting Recorder: Rosana Nesheim

Attendees:

Committee Members/Alternates Present

Jan Balsom, NPS, GCNP
Clifford Barrett, UAMPS
Charley Bullets, Southern Paiute Consortium
Shane Capron, WAPA
Bill Davis, CREDA
Kurt Dongoske, Pueblo of Zuni
Craig Ellsworth, WAPA (Alternate)
Charlie Ferrantelli, Wyoming State Engineer's Office
Paul Harms, New Mexico Interstate Stream Commission
Brian Healy, NPS, GCNP*
Ken Hyde, NPS, GCNRA

Vineetha Kartha, ADWR
Jakob Maese, Hopi Tribe
Ryan Mann, AZGFD
Craig McGinnis, ADWR
Jessica Neuwerth, CRBC
Emily Omana Smith, Reclamation
Richard Powskey, Hualapai Tribe
Ben Reeder, GCRG
Peggy Roefer, State of Nevada
Seth Shanahan, Southern Nevada Water Authority
Jim Stroger, Trout Unlimited, IFF

USGS/GCMRC

Michael Moran

Scott VanderKooi

Reclamation

Bill Chada
Heather Patno

Daniel Picard
Lee Traynham

Interested Persons

Jeff Arnold, NPS, GCNRA
Richard Begay, Navajo Nation
Kelly Burke, GCWC*
Winkie Crook, Hualapai Tribe
Martina Dawley, Hualapai DCR
Sinjin Eberle, American Rivers*
Jessica Gwinn, USFWS

John Jordan, Trout Unlimited & IFF
Sarah Larson, Upper Colorado River*
Rosana Nesheim, Galileo Project (Notetaker)
Shayna Ortega, Galileo Project (Notetaker)
Theresa Pasqual, Joint Tribal Liaison
Bill Persons, Recreational Fishing*
Erik Skie, CWCB*

**Denotes attendees participating solely via Webinar*

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Presentations and Discussion

Welcome and Administrative

Presenter: Seth Shanahan, TWG Chair & others, as assigned

Presentation & Discussion Summary:

- Quorum Established with 16 members or alternates present.
- June 11-12, 2019 Meeting Minutes are still in draft form and will be included on the January meeting agenda for approval.
- Future Proposed Meetings for 2020:
 - January 14 & 15 Annual Reporting meeting
 - January 16 TWG meeting
 - *Lee stated that based on feedback from people interested in the researchers meeting in Durango on January 14 & 15, TWG will try to accommodate both meetings by shifting the annual reporting meeting to January 13 and 14 and the TWG meeting to January 15. Seth added that TWG will try to coordinate better with the Upper and Lower Basin groups to avoid meeting date conflicts in the future.*
- Seth stated that TWG anticipated discussions on the SEAHG and BAHG to start now in anticipation of work planning activities. Seth added that he expects to have more discussion with the ad hoc chairs in the next couple of months to determine what activities to plan and how to plan those activities.
 - *Craig Ellsworth asked that any new TWG members consider participating in the ad hoc groups.*
 - *Ben Reeder stated that more activity will occur once the SEAHG updates its charge.*
 - *Seth asked that any TWG member who is interested in participating in any of the ad hoc groups reach out to the ad hoc group chairperson.*
- Ryan Mann reported that AZGFD successfully conducted rainbow trout stocking in late spring and early summer. The fish have continued to show up in the creel as recently as the week of October 14, 2019. AZGFD put in a total of 6,000 fish and added the last of the fish on June 24. AZGFD does not anticipate adding more fish but is monitoring the catch rates. Ryan anticipates presenting the results from the research project presented at the June 11-12 TWG meeting during the annual reporting meeting in January.
 - *Kurt Dongoske asked if AZGFD stocked with triploid trout; Ryan responded in the affirmative.*
 - *Jan Balsom asked what measurements AZGFD used to determine success AZGFD. Ryan responded that AZGFD is still reviewing the data and measured estimated catch rates based on what AZGFD found in the creel. Ryan anticipates having an estimate of the number fish that return to the creel based on the 6,000 fish AZGFD stocked. AZGFD measured whether the fish were available to anglers within the walk-in zone and whether the fish remained long enough. AZGFD also monitored downstream to ensure the ability to target anglers at the catch area. Jan asked how AZGFD determined success, and Ryan responded that AZGFD does not have a quantifiable metric for success, but because the number of fish available at the fishery has been low, AZGFD considers any increase in catch rates as beneficial.*
 - *Kurt stated that when AZGFD spoke with the Pueblo of Zuni, they indicated any uncaught trout introduced into the river would not survive more than three months because these trout are not accustomed to foraging for food. Kurt asked if AZGFD is able to track longevity and mortality rate within the system. Ryan responded AZGFD monitored about 70 acoustic-tagged fish for longevity and mortality and was still processing that data. AZGFD expects to report on a percentage of persistence for that group of fish for up to three months at the annual reporting meeting in January.*

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- *Jim Strogon asked where AZGFD stocked the fish and whether any of the fish moved upstream. Ryan responded that AZGFD stocked the fish around the bend, which is less than half a mile upstream of the boat dock. AZGFD did not stock any fish below the boat dock and focused on releasing fish around the walk-in area. AZGFD did see some movement into upstream areas, but Ryan did not have exact figures to report. Fish did occasionally show up in the upper reaches, but those numbers were relatively small compared to the number of fish around the boat dock. Ryan added that a number of fish moved down into the Paria.*
- *Scott VanderKooi followed up on Kurt's question and stated GCMRC would present any available information regarding recaptures and recapture locations for the past year as part of the trout monitoring in Glen Canyon and in the Little Colorado River.*
- Scott VanderKooi provided an update on GCDAMP river trips and field activities to occur during fall 2019.
 - *Because there will be no fall HFE in 2019, there will not be a fall river trip associated with monitoring fall HFEs.*
 - *AZGFD plans to monitor humpback chub down stream of Diamond Creek between October 24 and October 28.*
 - *GCMRC has a trip scheduled for November 2 for project H rainbow trout monitoring in Glen Canyon.*
- TWG members provided an update on items of interest that TWG is considering for implementation before the January annual reporting meeting.
 - *Jim Strogon informed the group of a proposal for two dams on the Little Colorado River and their potential impact on the ecosystem if the proposal is approved. Jan added that FERC posted the notice for public comments in the Federal Register for each of the two projects. FERC instructed the public to comment on the FERC docket with deadlines of November 8 for one proposal and November 22 for the other proposal. One of the proposed projects affects the San Francisco River. The American Rivers group plans to intervene on both proposals. Jessica Gwinn stated that the USFWS is working with other DOI agencies to provide comments on each of the proposals. Vineetha Kartha stated that because the proposals are within Arizona, ADWR also has concerns with the proposals; however, because the action areas for the proposals are completely within the Navajo Reservation, ADWR does not have any jurisdiction. Vineetha added that AZGFD will be the lead agency because AZGFD does have jurisdiction with respect to species compliance. ADWR is working with AZGFD to provide comments on both projects on behalf of the state of Arizona. Jan Balsom asked whether Vineetha and Ryan would include concerns from the Arizona SHPO for historic properties within its jurisdiction. Ryan stated he would look into adding Arizona SHPO concerns.*
 - *Lee provided updates from Reclamation. The White House signed an executive order in the summer to review efficiencies within federal advisory committees. The review is ongoing, and Lee expects DOI to provide Reclamation with a status update for the AMWG approval. DOI has asked AMWG to hold up membership nominees at this time. Reclamation is working with DOI to reopen membership nominations as soon as possible. Once DOI provides AMWG with formal notification of FACA review clearance, Reclamation will notify the public via federal register to submit nominee applications. Lee advised that members prepare nominee applications in advance for submittal as soon as DOI reopens the nomination process.*
 - *Jim asked whether nominees who are in limbo should carry on in their current capacities. Lee responded that a handful of nominee packages are in process. Lee expects DOI to provide a response on those nominee packages at the time DOI notifies AMWG of the reopening of the nomination process. Jim asked whether current AMWG members should continue attending*

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- meetings and participating in conversations, and Lee responded in the affirmative. Lee added that members with expired terms need to go through a new nomination process, and that stakeholders should be prepared to resubmit nomination packages for members whose terms are expiring within the next six months, once DOI reopens the nomination process. Richard Powskey stated that DOI approved his nomination package in the summer but has not approved Peter Bungart's application, even though Peter's was submitted first. Richard asked whether DOI is prioritizing tribes. Lee responded that everyone is priority to AMWG, but that DOI is still reviewing Peter's and other nominees' packages. Craig Ellsworth asked how a member might know when it is time for membership renewal. Lee stated that terms end three years after the start date, and that members who need to know the end date for their terms should request that information. Kurt commented on the significant amount of time between the application and the approval and asked if DOI considers treatment of stakeholder groups, so the stakeholders' voices are not silenced or diminished.*
- *Lee encouraged stakeholders with no active member, or with a nominee in limbo, to come to the table and ensure their voice is heard. Although nominees in limbo cannot vote, those stakeholders can still be represented. Richard asked whether the TWG nomination was the same as the AMWG nomination. Lee clarified that TWG and AMWG have separate nomination processes, but that stakeholders could nominate the same representative and alternate for both work groups. Lee also stated that the AMWG nomination process is more challenging and that the DOI secretary makes decisions on whether to approve AMWG nominees with the White House. Richard stated that the Hualapai Tribe would like to be represented in the TWG and had possibly already submitted nomination packages. Lee stated she did not see nominations for TWG from the Hualapai Tribe but encouraged the Hualapai Tribe to submit the nomination applications. Seth emphasized the importance of a formal process but also wanted to ensure stakeholder organizations were all represented, even without a formal approval. Although nominees without a formal approval cannot vote, they can provide input for consideration. Kelly Burke asked whether nominees who are not formally approved could be reimbursed for expenses, and Lee stated the TWG could work with those individuals to help ensure they are able to participate in meetings. Kelly added that some nominees rely heavily on those reimbursements.*
 - *Lee brought up the active litigation related to the LTEMP and stated that although DOI cannot comment on active litigation, the group should know that DOI will continue to implement the LTEMP with guidance from DOI Solicitors and DOJ. Lee does not expect anything different to occur on a day-to-day basis, but there will be a lot of work behind the scenes while DOI coordinates with Solicitors to build an administrative record. Lee did not expect that work to impact TWG meetings.*
 - *Emily Omana Smith announced she would be leaving Reclamation and returning to GCRA within the next couple of months.*

Update on Hydrology, Operations, and Reservoir/Release Temperatures

Presenter: Heather Patno, Reclamation

Presentation Summary: Upper Basin storage is decreasing, and Reclamation expects storage to continue to decrease through the remainder of winter and into next spring. Storage was above average in water year 2019 for every basin in the Upper Colorado River. Reclamation issued the forecasted unregulated inflow for water year 2020 on October 2. The Colorado and the San Juan storage units are very dry with a decrease in their forecasted unregulated inflow. Blue Mesa and Navajo storage units have also seen a decrease, and Lake Powell experienced a 1 maf decrease from September to October. Because of how dry it has been, there was insufficient sediment input to trigger a fall HFE.

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Reclamation updates the minimum, maximum, and most probable releases four times per year. The unregulated inflow volume average is 10.84 maf, and the observed volume for water year 2019 was 12.95 maf, or 120% of average. Spring 2019 was 145% of average at 10.41. The October most probable release was 9.5 maf, or 88% of average. The October minimum probable release decreased to 6.7 maf, or 62% of average. The maximum probable decreased from 19 maf to 18 maf, which is 166% of average.

Reclamation was in the Upper Elevation Balancing Tier for water year 2019 and experienced an April adjustment to balancing and a 9.0 maf release. October through March of water year 2019 was dry, but there was an updated new annual release volume every month. Reclamation is releasing according to the LTEMP. Water year 2020 started October 1, and Reclamation set the tier in August 2019. Lake Powell and Lake Mead are in a normal or surplus condition. Reclamation can release 8.23 maf of water and has a couple of options for moving to balancing or equalization, for which Reclamation is implementing the interim guidelines, Section 6b. Reclamation expects to be in the upper elevation balancing tier, and the 24-month study projections include September elevations in Lake Mead to drop below 1075 feet, which would put Lake Powell into balancing. Reclamation still expects Lake Mead's most probable elevation to be above 1075 feet. Inflows into Powell increased for an 8.23 maf water release under most probable. Maximum probable shows that elevation at the end of September will be above the equalization line. Reclamation expects the October maximum probable water release to be 11.89 maf. Under all three scenarios, Reclamation expects to be in the Upper Elevation Balancing Tier going into water year 2020.

Reclamation is updating the original transformers and has unit maintenance and replacement outages scheduled for 2020. Reclamation does expect to meet the requirements for the minimum, maximum, and most release projections. Reclamation expects to complete maintenance on unit two in December 2019 and has experienced some maintenance issues on unit six. Only five units will be available at the beginning of November with the sixth coming online in mid-November. Reclamation will test to ensure everything is online in December with eight units available. Reclamation anticipates maintenance on units seven and eight in the spring, on units three and four in the summer, and on units five and six in September. Reclamation anticipates having four to six units available during most of water year 2020.

Using the October minimum, most, and maximum probable release projections, Lake Powell release temperatures are showing a disconnect between the observed conditions and what the model is showing. Reclamation is working on the issue and expects to have it fixed soon. Temperatures are higher at the reservoir and cooler closer to the Penstock. Reclamation updated Robert Radke's graph, which shows changes in elevation between water years 2000 and 2019 and includes the profile for the entire reservoir with dissolved oxygen. Reclamation noted a pattern of decreased dissolved oxygen levels with high inflows going into Lake Powell. This tends to occur in the fall and is resolved by the end of the year. Years of historic concern were 2005, 2017, and 2019. Reclamation is concerned with numbers about 20 meters above current penstocks and the stratification and shift in dissolved oxygen values going into December. [Additional details are in Attachment 1.](#)

Discussion:

- *Jan Balsom asked why the most probable is lower than the minimum probable. Heather responded that one of the difficulties with using the Lake Mead slides is that none show Lake Mead going below 1075 feet. With the 24-month study, Reclamation puts in an 8.32 maf pattern and uses those inflow projections of 6.7 maf for minimum probable, 9.5 maf for most probable, and 18 maf for maximum probable. Reclamation put in an 8.32 maf release pattern and added the three inflow scenarios into the 24-month study, which is why it goes above equalization. Reclamation makes certain assumptions in the Upper and Lower Basins and projects 50% exceedance for the most probable and*

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a 10% exceedance going into the minimum probable. Reclamation makes assumptions in the Lower Basin based on expected water demands and on expected inflows, which are associated with dry hydrology. Once the dry hydrology goes into the 24-month study, the amount of water decreases going into Lake Mead and decreases its elevation below 1075 feet; Lake Powell was above 3575 feet. Decisions for Lake Powell and Lake Mead releases are based on end of calendar year and end of water year elevations. This moved Reclamation into a different subparagraph of the interim guidelines, which balances between 8.32 maf and 9.0 maf. Reclamation stayed in the first paragraph of the interim guidelines for the most probable. Heather clarified that the interim guidelines are different than the LTEMP. Jan asked whether the data was based on the modeling and the way it is projected, and Heather responded in the affirmative. Heather added that modeling is directly tied to the 2007 interim guidelines for Lake Powell and Lake Mead.

- *Sinjin Eberle asked if the Lake Mead projections included the 400 kaf that Metropolitan announced they would leave in the lake for 2020. Heather directed Sinjin to the Lower Colorado portion because they implement their ICS and drought contingency plan counting assumptions separately from the Upper Basin. Sinjin asked whether Reclamation is taking into account that 400 kaf, which is equal to four feet of water, will be left in the lake. Heather responded that Reclamation takes all of those assumptions into account, but Heather is unaware whether Reclamation put those assumptions into the October 24-month study assumptions for Lake Mead. Seth stated he assumed that information was included but declined to confirm the information because a representative from the Lower Colorado Region was not on the phone to provide more accurate information.*
- *John Jordan asked if Heather could provide the slides from her presentation. Heather stated she could distribute the presentation and upload it onto the website.*

Update on Non-Native and Native Aquatic Species – 1) Status of the National Park Service’s (NPS) Environmental Assessment; 2) Incentivized Harvest Program; 3) Brown Trout; 4) Green Sunfish; 5) Razorback Sucker; and 6) Humpback Chub Translocations

Presenters: Ken Hyde, NPS; Brian Healy, NPS

Presentation Summary: **1) Status of the National Park Service’s (NPS) Environmental Assessment; 2) Incentivized Harvest Program (Ken Hyde):** NPS started working on an expanded non-native aquatic species management plan two years ago and now has a PA in place. NPS signed the FONSI on October 9, 2019 and is now implementing the management plan and the PA. In most cases, NPS will start with tier one options or tools. Populations of the two main species that were already present in the area, green sunfish and the brown trout, have increased since 2014. NPS has also seen occasional catches of walleye, striped bass, and a few other species of fish.

Tier one options for implementing the management plan include guided fishing trips, incentivized harvest, and support for brown trout-focused fishing tournaments. NPS has committed to using incentivized harvest during the next three years to encourage anglers and provide opportunities for tribal youth to visit Glen Canyon. NPS has \$30,000 in funding for guided fishing trips, which can include five to ten youths and up to two tribal elders from each tribe. Tribes determine the selection process and NPS covers all expenses. NPS will use incentivized harvest to remove about 50% of the estimated 5,000 adult brown trout to decrease population and to minimize threat to down-river habitats. GCC will collect fish heads and data cards and will make payments to anglers. Payments will start at \$33 per fish for the first 1,000 fish. NPS requested \$50,000 from NPS funds to conduct incentivized harvests during 2020 and 2021 (fall and winter). NPS will hold a brown trout-focused tournament using NPS funds and with sponsorships from GCC outreach efforts. NPS expects to spend about \$100,000 per year for incentivized harvest and fishing tournament payouts.

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4) Green Sunfish (Ken Hyde): NPS added netting to the screens at the Glen Canyon sloughs at RM-12. NPS anticipates adding another set of screens up higher because green sunfish still go over the top during high flows. The new netting has pencil-sized holes, and some of the sunfish are still getting through. NPS used an ammonia treatment in fall 2018, but the sunfish survived because there was too much water. NPS is considering live transport as an option for 2020. Each sunfish can spawn thousands of eggs. NPS removed several thousand green sunfish between May and September 2019.

3) Status of Brown Trout (Brian Healy): NPS is working with GCMRC to analyze brown trout movement. The introduction of brown trout all over the world has caused extirpation of native species, so this has become a long-term priority for the AMWG. NPS introduced large-scale brown trout removal at Bright Angel Creek to try to counter the threat using electrofishing through 15 kilometers of the stream and with the installation of a weir during the fall and winter months. NPS has observed positive trends, including increases in native fish and decreases in brown trout and rainbow trout. The decrease could be linked to a system-wide decline in brown trout. More recently there has been an increase in brown trout at Lees Ferry and stakeholders have been trying to address why the fish are moving to Lees Ferry. Hypotheses include fall HFEs, frustration with the Bright Angel Creek weir, lack of access to spawning areas, and decrease in food availability. NPS has implemented the weir at Bright Angel Creek consistently since 2010. Increases in water temperatures and a decline in rainbow trout, which opens a niche space for brown trout, could be factors influencing reproduction.

To analyze brown trout movement, NPS and GCMRC analyzed PIT-tag data from 4,038 brown trout tagged from 151 main channel electrofishing samples between 2000 and 2018, with an additional 82 recaptures from 66 samples within Bright Angel Creek. During that time there has more brown trout movement upstream. NPS and GCMRC recognized the need for scaling its model to account for large spatial variability. They used a multistate mark-recapture model to monitor movement of brown trout across seasons and tested two covariates, which are the years in which the weir was in place at Bright Angel Creek and the years in which fall HFEs occurred. Preliminary conclusions include increased movement during HFEs (no directional bias), warming temperatures in the fall boosted egg survival, and a decline in rainbow trout diminished interference spawning. NPS expects to conduct additional modeling with added covariates and recaptures and to increase electrofishing below the weir.

5) Razorback Sucker (Brian Healy): NPS has been working with ASIR, Bio-West, and Reclamation since 2014 to help support larval and small-bodied razorback fish sampling from Bright Angel Creek to Lake Mead at more than 50 randomly selected locations. Researchers have observed a large-scale decline in catch rates of larval razorback. Numerous sonic-tagged razorback sucker have been release inside the Grand Canyon and at Lake Mead during the study. Fish were initially moving past Pearce Ferry, but detections has since declined, with only one detected in 2019. Pearce Ferry might be working as a barrier from Lake Mead. NPS has considered augmenting razorback in the Grand Canyon.

6) Humpback Chub Translocations (Brian Healy): NPS initiated annual translocations of adult humpback chub to Shinumo and Havasu in 2009 and to Bright Angel Creek in May 2018, then compared the survival results to the source population in the Little Colorado. Adult humpback chub survival rates were similar to published survival rates for juvenile humpback chub in the Lower Colorado. Fire and floods in 2014 caused the extirpation of humpback chub; rainbow trout have since recolonized from upstream.

[Additional details are in Attachment 2.](#)

Discussion:

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- *Jim Stroger asked if the source of the green sunfish is Lake Powell, why would NPS relocate them back to Lake Powell. Ken responded that the State will only authorize relocation to source waters; however, NPS would return the sunfish at least a few miles away from the dam.*
- *Craig Ellsworth asked what monitoring NPS is conducting in some of the other sloughs. Ken responded that NPS has monitored at Six-Mile and at the Lower Colorado River and continues to conduct electrofishing in the lower slough. NPS has not seen reproduction or spawning of green sunfish in the lower slough. Craig stated that possible problems were identified in the slough at the LCR and asked whether anyone is checking the other sloughs for reproduction. Scott VanderKooi responded that as part of GCMRC's routing monitoring for juvenile chub three to four times per year, GCMRC has collected the occasional green sunfish, but those have been larger adults. Craig stated that there is sometimes a slough-type formation at the lower end of the LCR, which puddles at the lower exit. Emily stated that NPS does some non-native fish surveillance seining at Kanab Creek and at the backwater at river mile 209 but was unaware of the slough to which Craig referred. Scott added that GCMRC has seen green sunfish at a couple of locations, including Kanab Creek, but was also unaware of any other locations. Brian Healy added that NPS has seen green sunfish at Kanab Creek and continues to work with BIO-WEST and ASIR on small-bodied and larval fish sampling below Phantom Ranch, and that this project can also track non-native fishes.*
- *Jim asked why NPS's lower limit for brown trout catches is six inches. Ken responded that including two- to six-inch brown trout could quickly exhaust NPS funds. Additionally, the focus of the incentivized harvest is to remove adult fish that can spawn within the next year. Jim asked why, if juveniles are easier to catch, are they allowed to grow and become more of a problem later. Ken stated that in the future, NPS might consider a full range of sizes, but it could become a problem if anglers focus on the juveniles because they are easier to catch and leave the adults to continue to spawn. Jim asked whether there was added value to leaving tagged fish in the water. Ken responded that the tag is not apparent until the fish is cut open and that the higher incentive for catching tagged fish was for NPS to get the tags back for reuse. Jim asked if the incentivized harvest was happening only during spawning season or throughout the year. Ken responded that NPS wanted to go to year-round incentivized harvest but wants to review data on the best months and when anglers are fishing.*
- *Jan Balsom thanked Ken for the work he conducted to pump out sloughs and to collect data. Jan added that the main goal is to minimize the invasive species in the system and is happy that NPS has raised questions on how to make this program more effective.*
- *Seth asked if NPS still needs the half of the funding that NPS will not provide for this year. Ken responded that NPS does need that additional funding and expects to look into some of the remaining funds from this fiscal year and then try to work some of the funding into the next triennial budget.*
- *Craig asked whether NPS has seen continued reproduction at Shinumo or new reproduction at Bright Angel Creek. Brian responded that NPS did observe a few humpback chubs spawning in the mouth of Shinumo Creek below the barrier falls, but did not catch many in the main stem. Currently, there are no humpback chub left in Shinumo Creek. They have not yet seen evidence of reproduction in Bright Angel Creek.*
- *Scott thanked Brian for sharing the results and asked whether NPS has thought about conditions that would warrant resuming translocations into Shinumo. Brian responded that Shinumo would provide an opportunity for restoring and renovating the creek for native fish and to remove rainbow trout, but NPS would need to think about that process more.*
- *Seth asked how many fish the SURs might be missing as they are currently configured. Brian responded that detection is not perfect and with unit maintenance over time, there might be a trend*

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towards decreased detection; however, the fact that detection is nearly zero is probably a good indicator that population has decreased. Seth asked if there are critical areas where NPS could add more SUR coverage. Ryan Mann stated there have been attempts to seek out additional funds to expand monitoring of humpback chub below Pearce. Seth asked whether SURs would be included, and Ryan stated PIT-tagging and portable PIT-tag arrays will be used to get detections. Brian confirmed that 39 brown trout had sonic tags and about 7,000 had PIT-tags. Jim asked if there were plans for additional tags. Brian responded that it was difficult to get enough monitoring because of the lack of dedicated funding. GCC provided a grant, which could allow for discussion about a study plan, budget, and goals for the future.

- Seth stated that there was ongoing conversation about the augmentation of the razorback sucker. Reclamation is committed to working with NPS to discuss the topic but has not implemented any effort yet. TWG will monitor information on cooperation between Reclamation and NPS as it develops. Brian added that the augmentation plan is part of the adaptive management plan and that everyone involved would like to continue moving forward with it.

Possible Experimental and Management Actions that May be Implemented in the Next 12 Months and Any Budgeting Issues

Presenter: Emily Omana Smith, Reclamation

Presentation Summary: The communication process for potential LTEMP experiments begins at the annual reporting meeting, followed by the TWG and AMWG meetings. The LTEMP ROD established a planning and implementation team to convene via telephone to consider resource impacts of each potential experiment. The team evaluates proposals using 11 resource goals to ensure avoidance of undue impact on those resource goals. The team then presents recommendations to the leadership team and to the Secretary of the Interior, who retains the authority to make the final decision. DOI sets up consultation meetings and is required to notify tribes at least 30 days prior to potential LTEMP flows. The GCD transformer maintenance schedule could impact potential experiments.

Reclamation is under continuing resolution funding through November 21. If an appropriations bill is signed, and if it is at similar levels to the past, Reclamation expects to receive about \$400,000 for its experimental management fund. Reclamation was unsure whether money from the native fish conservation contingency fund would be available but now has about \$1.5 million that is available. Reclamation is working on an AMP Funding Proposal Questionnaire, which is currently in draft form.

Additional details are in Attachment 3.

Discussion:

- Jim Strogon asked whether fall and spring HFEs were sediment-driven. Emily responded that fall and spring HFEs are sediment-driven but the proactive HFE is not. Jim asked if there was any scenario of resource benefits that would override the sediment as being the HFE driver. Emily stated that nothing is written in the LTEMP allowing that. Spring HFEs that are sediment-driven have those specific triggers of sediment accumulation. Jim asked if there was any way to override the sediment trigger, and Emily stated there was not a way, as it relates to fall or spring HFEs.
- Ben Reeder asked whether there would be any room to squeeze in a proactive spring HFE equalization between April and May. Heather Patno stated that the decrease in the forecast of one maf between September and October has decreased the probability of an April adjustment to equalization and increased the probability to balancing because the elevation has lowered ten feet. Heather added that observed conditions are lower in October than in September. Transformer units one and two have been out for maintenance during most of 2019, and Heather was unsure how long future maintenance could take. Replacement of transformers diminishes flexibility, but Reclamation could still consider it.

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- *Craig Ellsworth asked whether the LTEMP limits all proactive spring HFEs to 24 hours. Seth responded that a regular spring HFE needs to be 96 hours or less and a proactive HFE needs to be 24 hours the first time, but that subsequent proactive HFEs could be shorter, but not longer than, 24 hours.*
- *Paul Harms asked if data with positive results for bug flows was available. Scott VanderKooi stated that GCMRC has reported on that information a few times, and it should be available on the website. Scott confirmed that the positive results are in relation to EPTs, and that GCMRC saw a four-fold increase in the abundance of caddisflies in the Grand Canyon. Caddisflies were more abundant than midges in GCMRC's samples.*
- *Seth stated that additional experiments and management actions in the LTEMP that have not been considered include low summer flows, mechanical removal as a tier two option, tier one experimental management actions, and expanded translocation of chub in the Colorado River. Jessica added that FWS is working on translocating fish out of the LCR but have not met tier one triggers, which would be low enough numbers of humpback chub to trigger the need to augment those numbers. Tier one triggers have not been met for the head start program for larval humpback chub, but FWS is conducting similar activities outside those triggers.*

Update on Trout Management Flow Discussion Group

Presenters: Emily Omana Smith, Reclamation

Presentation Summary: In discussing spring 2019 LTEMP experiments, the group discussed bug flows and trout management flows. The group decided to put trout management flows on hold and to recommend a second year of bug flows. The group held calls with the DOI federal family technical representatives to discuss what DOI has done, what DOI had planned, and what compliance the group had. Additional calls were held with a wider stakeholder group in fall of 2019. . In the fall, Reclamation will initiate formal tribal consultation. GCMRC is meeting internally to discuss next steps and will present additional information at the annual reporting meeting. The larger stakeholder group requested DOI Solicitor input a several TMF_related questions. The Solicitor confirmed that the implementation window for TMFs described in the LTEMP ROD was not flexible and that proposals should follow the intent of the action as described in the ROD. The Solicitor agreed that TMFs could be designed to strand young of year trout or to disadvantage them. **Additional details are in Attachment 4.**

Discussion:

- *Kurt Dongoske expressed appreciation for the acknowledgement of tribal consultation but commented that generally, the agency makes a decision prior to consulting with tribes and that tribal concerns don't appear to receive significant consideration. Kurt encouraged the agencies to reach out to the Pueblo of Zuni while evaluating considerations. Emily acknowledged the importance of communicating with tribes and added that Reclamation is working to start those conversations.*
- *Seth Shanahan asked whether anyone from the tribes was involved in the consultation, and Emily responded that no tribal representatives have expressed interest in participating on the calls. Seth stated it would be helpful for tribes to be involved in conversations. Kurt stated that information might have come to him in an email, but he did not pick up on the nature of the call. Emily stated she would add Kurt to the list for future calls.*
- *Jan Balsom stated that Navajo Game and Fish wants to be included in conversations. Jan added that there have been many discussions over the years, but because of changes in representation, it might be beneficial to step back and relay the context to new tribal representatives. Emily stated October 23 would be a day of meetings and encouraged participation from tribal representatives.*

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- *Ben Reeder expressed interest in participating in some of the calls because trout management flows could affect him directly. Emily stated the LTEMP recognized safety concerns and the associated outreach that would need to occur.*
- *Jessica Gwinn encouraged members to email her to catch up on missed conversations and on information Emily has presented in the last several meetings.*

Potential Fall High Flow Experiment (HFE) ≤ 96 Hours or ≤ 192 Hours – Status of Resources and Experimental Plan

Presenters: Scott Vanderkooi, GCMRC, and Lee Traynham, Reclamation

Presentation Summary: The LTEMP ROD has a specific process for implementing experiments. When an HFE is triggered, Reclamation reviews impacts and makes a recommendation to the leadership team, who then makes a recommendation to the Secretary of the Interior. Reclamation also communicates and consults with tribal partners prior to implementing experiments. On September 23, Reclamation emailed tribal partners with a consultation letter signed on September 20 to advise of a potential fall HFE. After recalibrating the sand budget model to better capture the amount of sediment input coming into the system, nothing happened to trigger the fall HFE. The low amount of precipitation during summer 2019 only allowed Reclamation to trigger a 60-hour HFE. Reclamation was interested in sand mass balance in Upper Marble Canyon, with the objective of avoiding erosion. The sand budget model compared releases from the dam as projected with projected Marble Canyon sand mass balance, and the results were not enough to trigger the HFE. Sediment accumulation runs from July to November, targeting the first two weeks in November for the HFE. Due to the amount of required planning and communication, Reclamation needed to make a determination on whether to conduct a fall HFE in early October. On October 3, Reclamation determined sediment conditions in early October did not support a 2019 fall HFE, issued a summary memo on October 18, and held a public affairs coordination call on October 19 to make everyone aware. **Additional details are in Attachment 5.**

Discussion:

- *Helen Fairley commented that Reclamation changed the sediment triggering window de facto by making the determination 30 days prior to the deadline. Lee responded that if it would have been close, Reclamation would have had more conversations about the fall HFE. Helen expressed concern for the general practice of making the determination based on information that is available in October and not based on what is in the LTEMP. Seth Shanahan expressed appreciation for Helen's comments and added that sometimes the TWG learns from implementing experiments, and there are opportunities to continually think about what additional efficiency experiments Reclamation might employ.*
- *Richard Powskey commented that on the west end of Glen Canyon, sediment buildup has created a lot of sandbars in the river and asked whether the TWG was addressing that. Scott responded that the TWG has discussed surveys, but nothing has come of it. Scott agreed that it was worth discussing. Richard commented that it might not be a concern for the TWG, but it is a concern to the Hualapai Tribe. Jan Balsom stated that Paul Grams has talked about this, and the biggest controlling factor is the amount of water in Lake Powell and in Lake Mead. Richard asked whether the lower reach of the canyon was part of the TWG and asked what the plan was for addressing or not addressing the situation. Kurt Dongoske added that the Hualapai Tribe has brought up this issue repeatedly over the years, and he encouraged the group to think about how to mitigate negative effects. Seth asked whether the driver is the elevation in Lake Mead. Jan responded that was Paul's statement, and Jan thought Paul could potentially follow up on the conversation. Lake levels drive where sandbars occur, and since lake levels have gone down sediment has migrated downstream. Scott stated he could get more information from Paul because this is an area of interest, and he*

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offered to add it for discussion in the upcoming planning year for the next work plan. Helen stated that Ed Shenck was also involved in looking at the issue, and that Ed had determined that sediment can't be evacuated when Lake Mead levels are low. Ben Reeder agreed with Helen that if the dam were not in place, sediment would move lower into Lake Mead, making the west end of the canyon difficult to navigate. Ben commented that a lot of sediment banks appear eroded away along miles 262 to 263 of the Hualapai boat docks and asked if adding more permanent structures there made it easier. Richard responded that it seems to accommodate for safety, and he does not see it as a development. Richard emphasized the need for continuing to monitor and watch the river due to the issue of sandbars. Ben stated it was a safety concern and that the permanent structure makes it look more stable. Seth commented that the group does not have the expertise to understand the major drivers that contribute to sandbars, but that the group could investigate further after the meeting. Richard asked how much sediment was deposited from flash floods and added that going down the canyon, creeks flood and send boulders down the river, which becomes an added source of sediment. Scott stated that Richard was correct and that the group does monitor sediment transport and how much is moving among the different reaches of the river. Scott emailed Paul Graham to request more information related to this issue.

Discussion of Reactivating the Cultural Resources Ad Hoc Group (CRAHG)

Presenters: TWG Members

Presentation Summary: This is an opportunity for TWG members to discuss challenges and issues in having tribal perspectives heard within the TWG and how to better incorporate tribal and cultural resources in the TWP process. A primary task is to have a place to talk through potential project proposals for the upcoming TWP.

Discussion:

- *Martina Dawley stated that Peter Bungart of the Hualapai Tribe sent her to bring up the idea of TEK studies as a possible project proposition for the TWG. Martina added that TEK is important and could benefit some of the TWG's studies and projects, especially when emphasizing scientific merit. Martina stated that sandbars accumulating down river distresses the ecosystem, and that would be an opportunity for tribal members to study something that would benefit the tribal community. Martina confirmed that Peter thinks it is a good idea for the CRAHG to have these conversations.*
- *Richard Powskey stated that for the TWP, tribes put forth proposals, some of which require CRAHG input and support. Richard would like to see the support of tribes within the TWG.*
- *Kurt commented on the utility and effectiveness of the CRAHG, which was created as a result of the 2000 Cultural Resources Report and stated that tribes had submitted recommendations. Kurt commented that one recommendation from 2000 – a tribal consultation plan – took 14 to 15 years to initiate consultations. The Hualapai drafted a tribal consultation plan, which bounced between federal agencies and, in 2014, DOI and the federal government agreed with two and a half pages of the plan; however, there was no commitment from the federal government. Kurt stated that the TWG enjoys tribal consultation, but when tribes voice concerns, the federal agencies do a lot of deflecting to avoid considering tribal consultations. Kurt added that because the TWG does not give consideration to tribal relationships and knowledge systems, Kurt does not see the benefit of the CRAHG. Kurt suggested it would be more effective for the tribes to spend time in conversations with Reclamation to discuss NHPA.*
- *Martina stated she understands Kurt but argued that TEK is important. Martina expressed concern that when the TWG asks tribal members to discuss traditions, it sets the tribal perspectives apart as an alternative way of thinking. Martina emphasized that tribal ways are scientific, and that tribes need more government-to-government communication with Reclamation to better provide insight*

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into traditional knowledge. Martina added that without voice and visibility, tribes continue to go through the same issues because the federal agencies don't listen to the tribes. NHPA created a tool kit, and Martina offered her availability to help the TWG learn how to consult with tribes. Martina stated that if the TWG is sincere about wanting tribal representatives at the table, there should be more effort than just sending an email to the tribes. Martina reminded the TWG that tribes are sovereign nations and need to be at the table as an ad hoc group. Martina also expressed concern that tribal youth in college are pushed to pursue STEM programs with nowhere to work on completing degree programs. Tribal youth need to be able to incorporate traditional knowledge with STEM knowledge. Martina asked how tribes could step in and ensure they have voice and visibility and added that she is interested in helping the TWG with consultation.

- Seth commented that in lieu of the CRAHG, Reclamation has been organizing conversations with the tribes at certain intervals. Lee added that conversations in July were broad, and that there is a convergence in the need to speak to project proposals in relation to the TWP. Lee suggested monthly check ins in association with already scheduled meetings to ensure deeper conversations with tribal representatives. Lee stated there is a different set of conversations occurring around the PA and activities related to the PA.
- Ken Hyde stated that the TWG set aside October 23 for tribal representatives, NPS, GCMRC, and Reclamation to discuss future projects. The group drafted a historic preservation plan and set up a cultural resources program. The group anticipates addressing section 106 of NHPA and mitigating adverse effects in the canyons. Lee stated that if the TWG is looking to move monthly conversations to the CRAHG setting, there can be smaller group conversations with more definitive scope.
- Theresa Pasqual stated that part of the discussion has occurred at different times because meeting with the tribes is part of the ongoing dialogue between the tribes and Reclamation. Melinda Arviso-Ciocco of the Navajo Nation and Peter discussed reinstating the CRAHG during the AMWG meeting, but that Kurt was not there. Theresa commented on the difficulty of getting everyone together and recommended a refresher on the history of how the CRAHG was established. Theresa added that, as a result of the CRAHG dissolving, Reclamation increased conversations with tribal representatives, including a two-day meeting that received a favorable response from participating tribal representatives. Theresa also suggested the ability for tribes to initiate their own government-to-government consultations. Theresa also stated that if the TWG decides to reinstate the CRAHG, the group will need to develop a new charter.
- Kurt stressed that the CRAHG is a subgroup of the TWG, and in theory has experts on particular topics who can make recommendations to the TWG. The TWG votes whether to accept and act on recommendations, which is a different role from that of the tribe as a stakeholder.
- Jakob Maese seconded Theresa's input and the need for additional time to get input.
- Jan Balsom agreed with Kurt that there is no value in the CRAHG as a subgroup of the TWG.
- Craig Ellsworth stated that it would be important to hear from tribes within the BAHG, especially on tribal related projects. Craig added that tribal perspectives are important for determining how to spend AMP funds. Kurt stated the tribes could be members of the BAHG and provide input there instead of adding another step with the CRAHG.
- Seth expressed support for what works for the people at the table and suggested giving space for tribes to meet for additional consideration. Seth also suggested having an offline conversation after the initial conversation with Seth, Vineetha, and Lee to determine a good step forward.

Powerplant Capacity Flows – What is Known Already

Presenters: Mike Moran, U.S. Geological Survey

Presentation Summary: Mike provided a brief history of power plant capacity flows, which were initiated in November 1997. The result was that there was, overall, minimal positive net benefit to sandbars.

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USGS conducted two power plant capacity flows in spring and late summer of 2000 to determine whether seasonally adjusted flows were beneficial to aquatic habitat stability and to species like the humpback chub. High flows in the spring resulted in increased export of sand into Lake Mead, and high flows in late summer resulted in net sediment export into Marble Canyon. There were resulting sandbars, but most of the sand came from existing deposits rather than tributary inputs. There were no clear effects on humpback chub or other native fish from the late summer flows. **Additional details are in Attachment 6.**

Discussion:

- *Jakob Maese asked whether USGS has conducted more recent sediment tests based on changes in salinity and added that this is an important issue to the Hopi Tribe. Mike responded that he was unable to find a lot of water quality results and suggested Jakob review information from the September 2000 results.*
- *Jim Strogon asked what questions USGS hoped to answer from doing power plant capacity flows this time around. Scott responded that USGS has been discussing it and thinks there is a lot of interest for higher flows in the spring. USGS has conducted six fall HFEs in the last eight years but has not obtained enough information on the biological side from the few spring HFEs USGS has conducted. There was a lot of interest in sediment and sediment response, and sediment management was the primary focus of a lot of these efforts. USGS hopes to also gain ancillary biological responses. Some questions USGS hopes to ask include whether the aquatic food base responds, if one would see any type of response from macrophytes, and whether any other aquatic species might benefit. A number of questions relate to the timing of these events, and USGS is interested in responses that can be measured. Jim asked if there was any use in looking at different duration levels. Scott responded that magnitude and duration are linked together, so it is worthwhile to think about it more.*
- *Jan Balsom asked whether there was a difference between the research conducted in the 1996 EIS, the 1997 powerplant capacity flows, and the 2000 powerplant capacity flows and whether there was interest in anything above 45,000 feet. Scott stated that there were constraints beyond his control. The monitoring in the past may not have been as thorough on the biological side, and more current monitoring in terms of aquatic food base and primary production is needed; however, the program has evolved over time to allow USGS to zero in on items that are of interest to the program.*
- *Craig Ellsworth asked whether the spring powerplant capacity flows were conducted for biological reasons. Scott responded that was one option and thinks there will be some tradeoffs like a better handle on the sediment side or benefits to other resources. Craig asked how this would conflict with bug flows. Scott stated he did not know and would need to think about the possibility of it leading to confusing results. Seth recommended an ad hoc group discuss possible conflicts between experiments. Mike added that confounding results would likely make results less useful. Scott stated there were confounding factors and that USGS is monitoring programs that are better suited to catch responses.*
- *Jan commented that she started looking at this information based on GCMRC data and was curious if USGS was able to look at data sets prior to interim flows that went into effect in 1992. Scott stated that USGS wants to take advantage of all the available research.*

Flow Ad Hoc Group (FLAHG) Update

Presenters: Peggy Roefer, FLAHG Chair

Presentation Summary: In preparation for the meeting, Tara Ashby emailed a draft of the FLAHG charge. Once the FLAHG comes to a consensus on the finalizing the charge, the TWG will be able to recognize the group. Thirty-eight TWG and AMWG members have expressed interest in joining the FLAHG. Jim Strogon reviewed the initial draft charge and provided comments; however, the FLAHG is still

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uncomfortable with the charge as it is written and wanted to incorporate language from the Secretary's guidance memo. The FLAHG has also been working with GCMRC and Vineetha Kartha to develop the charge but has not been able to reach a consensus. [Additional details are in Attachment 7.](#)

Discussion:

- *Jan Balsom noted that Peggy brought up rainbow trout but not brown trout and asked whether it would not be included or if it was just an omission. Peggy responded that brown trout was not added to the charge because it was not in the Secretary's guidance memo, but it could still be added. Seth Shanahan stated that brown trout was problematic to the humpback chub and suggested that the humpback chub resource consideration would consider the effects on the drivers that negatively affect the humpback chub. Jan said she hoped the FLAHG would look at high threats to the integrity of the system the TWG is trying to protect. Scott VanderKooi stated that brown trout was part of the internal discussions.*
- *John Jordan asked whether Lee Traynham planned to reach out to AMWG stakeholders for comments on the process, and Lee responded that she did.*
- *John mentioned that he had emailed Peggy about information that was left out of the presentation and asked if she had considered it. Peggy stated she put the presentation together prior to receiving John's email. John commented that Peggy and the FLAHG did a good job in working through the charge with the exception of the last sentence of the first paragraph, which starts, "Pending further charge from the TWG..." John stated that this information came from recreational fishing representing other stakeholders who were trying to introduce a motion at the AMWG meeting to discuss how to move forward with spring HFEs. John pointed out that recreational fishing and other stakeholders are not casual participants in this process. The Secretary sent his email in context of power plant capacities. The proposal was driven by science, and conversations evolved into an interpretation of the LTEMP. John added that Reclamation makes that determination, and if the FLAHG wants to have an unfettered discussion, John cannot support the charge if it includes the last sentence. John thinks this will limit collective discussions and moved to strike the last sentence of the first paragraph. Seth asked John to clarify whether he did not want the FLAHG to be restricted in its conversations and asked whether John was afraid the FLAHG would not be able to discuss anything outside of what is written in that sentence. Seth asked if the intention behind eliminating the sentence was to discuss items outside of the ROD. John responded that there was no intention, and that he just did not want to limit the FLAHG from seeking out the best available science. Seth stated the guidance came from the Secretary and that the FLAHG needs to consider higher spring releases within the power plant capacity. The FLAHG wants to balance John's comment with the Secretary's guidance memo. John stated that the FLAHG constructed language that is an ending point. Ben Reeder commented that part of the problem with the Secretary's suggestion is that the LTEMP Table 1 states there is a 25,000 cap while the Secretary used the term "power plant capacity," and those are two different numbers. Ben added that the science shows minimal impact and questioned whether it makes sense to conduct the same experiment again to find minimal impact. Jim Stroger stated that one slide mentioned the Secretary's comment as a "potential starting point." The intent is that spring HFEs are part of the continuum of study. Seth agreed with Jim's interpretation. Vineetha agreed with John that the language appears to restrict discussions within the FLAHG. The FLAHG can discuss anything it wants to discuss, but that does not mean everything it discusses will be implemented. Vineetha added that the flow action needs to be within base actions and that conditions must be triggered to go outside those base actions. Jessica Nuewerth stated she understood the concerns with the charge being too limited but added that it is not restrictive because guidance is within the first step. The best way to focus on this is to view it as a first step, and these conversations are jumping over that first step. Jessica stated she supports the charge the way*

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it is currently written and added that it was important for the FLAHG to look at what is immediately before it, which does not mean the FLAHG can't ever look at anything more.

- *Craig Ellsworth responded to Vineetha's comment about the FLAHG being able to discuss things that would not become experiments. The government will not reimburse for expenses associated with those discussions, so the cost for any losses would be passed on to the rate payer. Vineetha asked whether losses associated with the spring HFEs were reimbursable. Craig responded that the rate payer pays if something is not specifically called an experiment. The Grand Canyon Protection Act states that non-experimental expenses increase purchased power costs.*
- *Cliff Barrett stated that when the FLAHG developed the language, Cliff could see that a large group of FLAHG members wanted to stick to the criteria in the LTEMP ROD. Given the Secretary's language, Cliff thought the FLAHG would continue discussions on capacity flows. Cliff added that he is happy with the current language in the charge.*
- *Ryan Mann shared John's concerns that the FLAHG might be limiting itself from potentially discovering tools that could be beneficial. Ryan thought that adding that into discussions would not contradict the Secretary's memo. Peggy stated that if spring HFEs are triggered, the TWG would do them. Ryan stated that there was no current mechanism or path forward to address the issue that spring HFEs might never be triggered.*
- *Jan stated she did not want to be restricted from looking at experiments that could solve some resource concerns, and she felt like the group was getting too caught up in what can or can't be done. Jan added that DOI Solicitors could find a way to work with something outside protocol if it reaches the TWG's goals.*
- *Ben stated that the objective of the program is for adaptive management, but the accounting period is problematic. Ben asked whether the TWG could adjust the accounting period and whether it would require an EA.*
- *Seth stated it did not sound like the group was in agreement of having suggestions outside protocol. Vineetha added that the TWG does not have NEPA compliance for anything outside the LTEMP. Jessica stated the group should evaluate what is available right now and see if it would work prior to deciding if anything additional is needed. Cliff added the group did not want to think about additional NEPA compliance by proposing something that was not within the charge. Cliff stated that this was the wrong group in which to decide on this, and that guidance from AMWG was needed. John stated concern that because of the restrictive language, the TWG would not be able to have constructive discussions on high flows for another four or five years. Michelle added that these discussions are necessary, and DOI is stating what the group can do that is within the ROD. It is a concern when the group wants to move outside the LTEMP ROD because that could lead to an EA that might take four or five years. Jan agreed with Jessica and Michelle that the TWG wrote in a lot of flexibility, so there is already a lot the TWG can do. Jan suggested the FLAHG start with ideas that would likely work and that the TWG is authorized to do, based on the LTEMP ROD.*
- *Lee commented that there appeared to be a lot of interpretations of the Secretary's memo. The TWG has limited resources and needs to focus on the LTEMP ROD. Proposals outside the LTEMP ROD will be difficult for DOI Solicitors to support. Lee added that there were already six potential experiments to choose from in 2020. Additionally, the memo mentions operational flexibility.*
- *Seth stated that his understanding of the conversation is that some of the group are uncomfortable with the sentence in question and others are uncomfortable with changing that sentence. Scott added that he objects to the first sentence in the second paragraph because he is concerned with overloading his staff since they are already busy.*
- *Bill suggested that AMWG make the decision and added that this was an entry level step to further discussion. John responded that the group continues to fall into the pattern of prior restraint and*

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making determinations based on a specific set of factors. The TWG's position was for looking to the GCMRC to make proposals based on science.

- *Seth announced that since the group had not reached a consensus, the TWG would table the discussion for now. Seth encouraged everyone to think about the discussion and alternatives.*

Public Comment

Comment/Discussion:

- *There were no public comments.*

Meeting Adjourned at 5:36 pm

DRAFT

Glen Canyon Dam Technical Work Group Meeting

October 21-22, 2019

Date: October 22, 2019

Start Time: 8:00 am

Conducting: Seth Shanahan, TWG Chair

Meeting Recorder: Rosana Nesheim

Attendees:

Committee Members/Alternates Present

Jan Balsom, NPS, GCNP

Clifford Barrett, UAMPS

Bill Davis, CREDA

Kurt Dongoske, Pueblo of Zuni

Craig Ellsworth, WAPA (Alternate)

Charlie Ferrantelli, Wyoming State Engineer's Office

Michelle Garrison, Colorado DNR

Paul Harms, New Mexico Interstate Stream Commission

Brian Healy, NPS, GCNP*

Ken Hyde, NPS, GCNRA

Vineetha Kartha, ADWR

Jakob Maese, Hopi Tribe

Ryan Mann, AZGFD

Craig McGinnis, ADWR

Jessica Neuwerth, CRBC

Emily Omana Smith, Reclamation

Richard Powskey, Hualapai Tribe

Ben Reeder, GCRG

Peggy Roefer, State of Nevada

Seth Shanahan, Southern Nevada Water Authority

Jim Stroger, Trout Unlimited, IFF

USGS/GCMRC

Tara Ashby

Helen Fairley

Ted Kennedy

Scott VanderKooi

Reclamation

Heather Patno

Daniel Picard

Clint Stone

Lee Traynham

Interested Person

John Jordan, Trout Unlimited & IFF

Sarah Larsen, Upper Colorado River*

Rosana Nesheim, Galileo Project (Notetaker)

Shayna Ortega, Galileo Project (Notetaker)

Amy Ostdiek, State of Colorado*

Erik Skie, CWCB*

**Denotes attendees participating solely via Webinar*

Presentations and Discussion

Welcome and Administrative

Presenter: Seth Shanahan, TWG Chair & others, as assigned

Presentation & Discussion Summary:

- Quorum Established with 16 members or alternates present.
- Unresolved issues from yesterday's meeting: The group did not come to a consensus on the charge put forth by the FLAHG. Seth emailed the draft charge with proposed edits from the previous day's discussion to all TWG members.

Discussion:

- *John Jordan stated that TWG members need to have the opportunity to evaluate the language in the charge and suggested the group come together at a later time to discuss the item further. John stated that whatever the group agrees to will go to Reclamation, so the group will need to come away with a segment or section that discusses the process. John added that the TWG needs to see the results of the spring HFEs in context of the fall HFEs. Ben Reeder agreed with John and stated he felt it was important to go through the LTEMP ROD process and do what can be done now to learn from the spring HFEs and discuss next steps. Ben added that the group should consider changes if the results are insignificant.*
- *Peggy asked John if what he wanted was an unfettered look by GCMRC experts at potential hydrographs. John responded that the next steps proposed getting back into the hydrograph realm. John did not think he was qualified to discuss hydrographs, and he did not think the hydrographs would be recommended. John added that the group is looking for definitive evaluations of potential benefits of spring HFEs driven by science and with input from scientists informing the group of what would work. John suggested making the FLAHG charge compatible with the Secretary's memo, with regard to looking at spring HFEs within the LTEMP ROD then as a sediment issue and as a power plant capacity. John thought the intentions of the previous day's discussions were good but thought the group went down some blind alleys and in different directions. John suggested an alternate charge with a different discussion and a different arena.*
- *Peggy stated that the group seemed to have taken the action item and morphed it with the Secretary's memo. Peggy added that the Spring flows are different than John's action item. John stated he was okay with morphing the two because it all goes into the assessment, which is the first step. John added that he wanted all the options available on the table.*
- *Vineetha asked if it would help to separate the charges and add that the FLAHG would work with GCMRC to conduct spring HFEs. John agreed that some kind of duality could work. Vineetha asked if John envisioned the FLAHG reviewing both or keeping the two separated. John responded that it could be together because the only issue is what can and can't be done under the LTEMP ROD. Vineetha suggested editing the wording.*
- *Jim Strogon commented on the point Emily Omana-Smith made during the previous day's discussion regarding flow regimes being LTEMP driven. The charge states other resources outside of sediment are important to the TWG. Jim suggested moving forward by revising the document, interpreting the document, or seeking an EA to determine if other resources are equal to sediment.*
- *Ben did not disagree but thought that higher flows caused the resource to take a higher hit and have a detrimental effect by stripping the canyon. Ben thought separating the memo from the action item was a good idea, and he suggested that after getting through the charge, it would be useful to get as much as possible from the flows and to test slowing down the ramping rate within microflow.*
- *Seth stated that John had suggested a discussion after the meeting to offer an alternative charge. John thought further discussion at a later time could help clarify things and take into account*

blending something that works for the group. Seth agreed it was a good idea and asked that John lead with what the alternate charge should state.

- *Peggy stated the group probably combined two things that should not have been combined. Seth responded that working together could result in a charge that accomplishes different items.*
- *Scott VandeKooi asked to be included in the discussion since Scott's staff has conducted spring HFEs.*
- *Jan suggested including Rob Billerback in the discussion because he is familiar with the LTEMP and the ROD. Seth agreed with Jan and added that some of Rob's text could be offered to the FLAHG.*

Water Temperatures Observed in Lake Powell and below Glen Canyon Dam

Presenters: Ted Kennedy, GCMRC

Presentation Summary: As of October 11, water quality has been improving as a result of falling temperatures and rising oxygen. The year 2019 was reported as the second warmest year on record, after 2005, and since Lake Powell was first filled. This resulted in higher water temperatures and lower dissolved oxygen. USGS observed the lowest levels of dissolved oxygen at the Glen Canyon Dam and higher levels downstream. Maximum dissolved oxygen levels increased due to algae production and minimum dissolved oxygen increased due to air-water gas exchange. In temperatures lower than 15 C, dissolved oxygen can be lethal to trout if levels are below 3 mg/L. In temperatures above 15 C, dissolved oxygen can be lethal to trout if levels are below 5 mg/L. **Additional details are in Attachment 8.**

Discussion:

- *Jim Stroger asked whether the TWG should consider using tubes more to mitigate low dissolved oxygen effects on the river during conditions of low dissolved oxygen. Jim also asked whether movement in the rapids was a problem for the ecosystem or if it was a solution. Ted stated there are ways to mitigate low dissolved oxygen, which are worth considering, but Ted did not know if Reclamation should try to mitigate without knowing the potential costs. Reclamation has seen water quality issues at other facilities, like high oxygen saturation that is lethal to fish on the Columbia River and low oxygen levels in other areas. Based on the total number of days with less than 5 mg/L of dissolved oxygen over the last 20 years, Ted did not think it was a problem that needed mitigation. Lee agreed with Ted's remarks and added that an issue is that Reclamation may not have the authority to use operations for this issue. Lee raised the question of whether or not there are other potential tools to consider for those interested in mitigation.*
- *Bill asked whether a drop from 4 mg/L to 3 mg/L would make a big difference to fish if the average was 6 mg/L. Ted responded that exposure to less than 5 mg/L over a long period of time is considered a chronic stressor and that values less than 3 mg/L were considered an acute stressor. Scott added that duration matters a lot and fish that are in good condition can tolerate minimum levels for a short time. USGS is monitoring for these issues and will report any concerns. In 2014, fish were in poor conditions and exposure to lower dissolved oxygen exacerbated the problem.*
- *Bill asked whether there was anything in the literature regarding the effect of duration and acute or chronic conditions of low dissolved oxygen on aquatic insects and their hatching ability. Scott said that information was available. Ted stated that Larry has done some interesting work on that.*
- *Craig Ellsworth asked how big the concern was to the State and to anglers and if there were ways to possibly mitigate effects in the future. Jim Stroger reported that guides were monitoring the issue and have been concerned for months, and that the lower levels of dissolved oxygen were a concern to recreational fishing. Dissolved oxygen might self-regulate to some degree, but temperatures were a bigger concern. Seth asked if there was any way to know if anything negative was happening. Scott responded that in terms of temperatures USGS sees, current temperatures have been optimal. The trout can handle 15-16 C; however, temperatures at 20 C would be more concerning. The optimal temperature for growth is 19 C with available food.*

- *Ted stated he has heard from anglers that fish appear lethargic, especially near the dam. USGS anticipates returning to Lees Ferry within the next week to conduct intensive marking efforts and plans to compare conditions of fish from late October and November to what USGS measured in September when the average condition factor was the value of 1. During the low dissolved oxygen event of 2014, the average condition factor was about 0.8. Currently, good conditions are a factor, and water quality is going in a better direction.*
- *Bill Persons stated that due to low dissolved oxygen in 2005, there were fish kills. At the time, Reclamation agreed to try changes in operations, like not running turbines at full capacity to introduce oxygen into the system. A concern was running in a “rough zone”, which was investigated in 2005. Ted stated that was what happened and pointed to the EPA manual that describes the effects of running turbines at low efficiency. Bill suggested that Reclamation consider this option if there is high runoff and the trout are in poor condition in the future. Lee added that the information regarding the 2005 operation was on the AMP website. Reclamation conducted the test over a period of a few weeks to determine its benefits, and there was some short-term improvement; however, cavitation is potentially bad for the turbines.. Reclamation did a follow-up review and assessment of the 2005 action. Lee stated that it would be unlikely for Reclamation to respond in the same way as in 2005.*
- *Seth stated that real negative effects could have occurred to the program’s value and asked whether Reclamation viewed this year’s results as a near miss. Ted stated that a near miss might exist every year moving forward and that there is value in discussing ways to manage and mitigate the effects. Seth recommended discussing the issue further in the future and that Reclamation capture the lessons learned from this year’s near miss to come up with actions in case the situation gets worse for the trout. Seth thought it would be helpful to have this tool available prior to having something like this happen in the future, which John agreed with. Jim suggested adding more power generation tubes for use in conditions like these.*
- *Kurt Dongoske commented that there was an inherent paradox with the concern for dissolved oxygen and its effects on trout, and that it seems to conflict with bounties and harvesting of trout. Kurt suggested that low dissolved oxygen might be one way to control trout.*
- *Craig commented that the objectives of the LSF experiment for the LTEMP include increasing temperatures to help with reproduction and growth of chub in the LCR. Craig asked if the group could get a report from the annual reporting meeting with a temperature signal this year on chub growth and reproduction at the LCR to avoid facing the LSF in the future and wondering if it would be an effective experiment. Scott stated that USGS could discuss how chub responded throughout the system, and not just the LCR. Craig stated the goal was to have a temperature at the LCR to target the 16 C. Scott stated that the goal was aligned with what was going on outside the LCR. Scott added that USGS would cover that information, and that FWS had conducted an additional aggregation survey with their monitoring work, which AZGFD also worked on. Seth stated that the objective of the LSF was to increase chub growth and the experiment is trigger specific and not site specific. Dividends in growth might not be available until next year. Scott agreed with Craig that the conditions were met and added that USGS could compare them to previous years at different temperature ranges.*

2020 – 2023 Budget Outlook Considerations

Presenters: Lee Traynham, Reclamation

Presentation Summary: The House of Representatives and the Senate put together a draft appropriations bill for full funding, but the president still needs to sign the bill. Reclamation has heard from WAPA and other stakeholders that the Basin Fund cannot be sustained indefinitely. The group needs to consider that sources from power revenues will not fund the program far into the future.

WAPA and Reclamation have been discussing how hydropower funds could help, but the group needs to acknowledge the uncertainty and risk of not receiving full funding. Reclamation will need to consider how to prioritize what is in the TWP. The BAHG will have some interest in prioritizing tasks and identifying alternative funding sources. Reclamation and other federal agencies make funding requests three years in advance and are now considering funding for 2022. The TWG cannot lobby Congress for money, but individual stakeholders can. Additionally, the fish recovery program can lobby Congress for funding.

Fall 2019 Knowledge Assessment – Planning and Implementation

Presenters: TWG Members

Presentation Summary: This was an opportunity for TWG members to discuss updates to the Knowledge Assessment for 2019 and to develop a consistent process that can be repeated throughout the LTEMP life. The TWG is interested in learning from past mistakes and for participants to be more knowledgeable of the process. The TWG also wants to improve processes based on past lessons learned and with input from GCMRC scientists and other members.

Discussion:

- *Peggy Roefer thanked the TWG for implementing this process. With so much information available, Peggy was unsure of how to access a lot of it. Peggy added that this is a mechanism that can at least answer some of those questions.*
- *Kurt Dongoske stated it was his first time reviewing the Knowledge Assessment and commented that the information on page 2 recognizes tribal values and breaks down resources into separate categories for study, but the document does not internalize the tribal perspective. Kurt added that the document appears to make the presumption that archaeological resources and cultural resources are synonymous, when archaeological resources are a subset of cultural resources. Kurt emphasized that there were multiple cultural values present at the table that require attention and consideration from the TWG. Tribes have knowledge about the canyon and its resources and the TWG should not dismiss the tribal relationships to the canyon or put those relationships into a lesser category than scientific knowledge. Kurt stated that science only gets funded when it furthers capitalist interests and suggested that the TWG consider tribal values about all the resources needed to elevate the TWG. Seth responded that was an important lesson from the 2017 Knowledge Assessment. The proposed framework that states western science approaches are not always appropriate has not progressed in resolving Kurt's concerns that tribal values are not taken seriously. David Braun offered activities to help the TWG down that pathway in 2017. Seth thought tribal liaisons had led the conversations and that there was support for the proposal, but it had stalled. David is not currently under contract with the TWG, and the TWG needs to resolve administrative problems to move forward or to find a different pathway. Seth agreed with Kurt and suggested that Theresa Pasqual's conversation with tribal representatives on the usefulness of the CRAHG could address those issues in a positive way.*
- *Theresa stated that Kurt did bring up a difficult topic for tribes to address within the Knowledge Assessment and that the 2017 Knowledge Assessment might not have asked the appropriate questions for assessing impacts from activities on tribal resources and the value associated with those resources. Theresa added that for many tribes, archaeological resources were cultural resources, but not all cultural resources are archaeological resources. The TWG did not work these changes into the 2017 Knowledge Assessment, and Theresa suggested reframing the question when moving into the next Knowledge Assessment. She offered to discuss this with tribal leaders.*

- *Seth stated that the TWG needs to make progress and pointed out that the information on the Knowledge Assessment was coming from the language in the LTEMP. Seth suggested giving more attention to how the TWG thinks about resources.*
- *Jan stated that the point of the Knowledge Assessment was to separate opinion from resource. Jan added that traditional knowledge is interesting and important to recognize because almost all topics include traditional knowledge. Jan commented that she would like the group to put effort into something that will be useful because the 2017 Knowledge Assessment did not meet that mark.*
- *Craig stated he thought the Knowledge Assessment was a good start and added that continuing to revisit it is part of the learning process. Craig added that the TWG would need to develop metrics, identify goals, and revisit the LTEMP goals with direction from Reclamation.*
- *Seth commented that quantifying a metric to some value the TWG is trying to achieve is difficult. AZGFD identified some quantitative targets, but apart from the LTEMP ROD, there are not a lot of quantitative targets that are already out there. Trying to achieve that is a next step, and Seth suggested giving Reclamation more time to determine the right process to get the TWG there. Seth also stated that the TWG does not need to have the conversation now if something can be achieved in the meantime, but the TWG will need to have the conversation at some point. Craig stated it was a process, and although the TWG does not need to have the conversation now, the process is moving in the right direction.*
- *Jan stated the TWG needs to know what it is measuring for, and for some resources, the TWG does know once those resources have been identified. One of the challenges from the ROD was for DOI to start working towards that. There have been some interruptions in moving that forward, but this is an opportunity to start working on it. The TWG has identified a lot of information in the LTEMP ROD, and now needs to come up with measurable targets. Lee stated that identifying measurable targets is a priority that Reclamation is working on. Lee added that there is some value judgement in identifying targets, and changes in administration may move those targets, making the process dynamic for the TWG and for Reclamation. As the discussion progresses, the TWG will need to know where those critical areas are because a lack of specific goals can hinder progress.*
- *Seth commented that the TWG could reach agreement on general direction for most resources but brought up the example of the riparian vegetation where the group was unable to agree whether to make the goal to have more or less native plants. Seth thought that if the TWG could, at minimum provide an actual metric, the group could then move the discussion to the AMWG for a determination on what specific numbers the TWG should track. Seth added that the conversations are not short and easy.*
- *Richard Powskey commented on a presentation he saw on the Grand Canyon that discussed how unnatural everything that has been done to it is, from building the dam to introducing non-native vegetation and has all impacted the corridor. The presentation looked at how to understand the unnatural part of the Grand Canyon, and Richard stated the TWG was trying to manage the unnatural parts of the Grand Canyon with the Knowledge Assessment. Richard added that there is no way to bring the Grand Canyon back to its natural state. Richard also commented on the impacts, through removal, to tribal and traditional knowledge from visitors. Richard stated that the TWG needs to find a way to maintain the unnatural system that is now present. Seth agreed with Richard and stated that the purpose of the LTEMP ROD is now to determine how to meet these goals related to the unnatural state of the Canyon.*

2020 Annual Reporting Meeting - Planning

Presenters: TWG Members

Presentation Summary: This was an opportunity for TWG members to talk through steps in the process for the guidance document, incorporate revisions, so that GCMRC, NPS, AZGFD can lead a process through January in preparation for the annual reporting meeting.

Discussion:

- *Seth Shanahan informed the TWG that the version on the screen contained additional comments from Scott VanderKooi that were not on the document handed out during the meeting. Seth wanted to be able to edit the document with more text because it was easier to remove unnecessary information than to add information.*
- *Seth commented that Kurt Dongoske had pointed out that tribal resources were not on the list. Jakob Maese clarified that the tribal resources were on the list, but the concern was for how they were presented. Seth responded that the TWG needs to make progress on how to better incorporate tribal resources. Kurt added that an approach to recognizing tribal values was not in the Knowledge Assessment, and that the guidance document relegates the topic to Reclamation through the dismissal of tribal perspectives. Seth acknowledged this was a major impediment in 2017, and TWG has not made progress since then. Seth asked how the TWG could integrate knowledge systems into the new Knowledge Assessment. Kurt responded that if he were Secretary of the Interior, he would have started by stating that the agency needs to deal with tribal concerns. Kurt added that he wanted to see all stakeholders embrace tribal concerns, but to get there the TWG would need to reevaluate some basic assumptions. Kurt suggested the TWG would need to stop treating resources as something that needs to be managed because that approach is maladaptive. Kurt stated that every stakeholder needs to internalize a way of approaching tribal perceptions and how those perceptions relate to the tribe as stewards of the environment. Kurt did not think bringing tribal concerns to the agency has been successful and suggested working with a broader group.*
- *Richard Powskey agreed with Kurt and expressed the need for the TWG to be careful about pigeonholing tribal issues as just cultural or archaeological resources. On the river trip, there was discussion of how to get tribal interests incorporated into the broader program. One suggestion was to get federal agencies to reach out to the tribe, not only for cultural reasons, but also to get the tribes involved in actual science. Richard emphasized the need to get more tribal representation into the science of the Grand Canyon. Richard asked how Native Americans could work within the federal agencies as a way to incorporate tribal values into the program.*
- *Craig Ellsworth stated everyone was a stakeholder and had an opportunity to participate in the program. He also added that the TWG has had a hard time getting someone to chair the program. Jan responded that the tribes do not have the same staffing levels and stated that there have been discussions on training programs and internships for future tribal leaders to take on aspects of the program. Jan added that the time commitment is hard on all stakeholders. She also stated that in the future, the TWG should be able to pair individuals with traditional knowledge working with others within the TWG to integrate and increase understanding of tribal resources.*
- *Vineetha thought Kurt's intent was for the TWG to understand resources from a tribal perspective as compared to a scientific perspective. The TWG is currently viewing resources from a scientific perspective, and the tribes have been informing the TWG that is not how they approach resources. Vineetha suggested adding a second section that adds the tribal standpoint or tribal values for each particular resource. Kurt responded that he would need to give Vineetha's proposal more thought to get a better idea of how that would manifest itself in the document.*
- *Seth stated that the TWG needs to allow some space for a liaison to advocate for a workable solution with tribes. Seth added that all TWG members should be thinking about this issue and asked whether the group was not ready to move forward because of these concerns or if the group could move*

forward with the western science approach and an added commitment to find tribal approaches and values.

- *Theresa Pasqual commented that her biggest fear with moving forward with the emphasis on western science, even with the added commitment to tribal perspectives, was that the TWG would once again produce a document that did not incorporate the tribal voice. Theresa added that the group needs to make time to flesh out a model or alternative with input from tribal partners. Theresa thought the group would move forward with the western science perspective and replicate the same model tribes have experienced in the past. Theresa pointed out that Kurt noted that tribal perspectives are based on relationships with the environment and that David Braun's question on how to evaluate resources was the wrong question to ask. Theresa thought the TWG needed to ask what the tribal relationship to resources was and what could be captured from tribal elders. Having tribal input would impact how the TWG would read the guidance document.*
- *Seth added to Craig's comment that there is comfort in knowing everyone was a stakeholder and everyone was invited to participate in the process. Seth also stated that in lieu of producing something immediately, the TWG could take some time to infuse information from the tribes through liaison-led discussions. Jim Stroger asked if Seth was suggesting continuing with the document in its current form with the idea that tribal input would come later and whether that would affect the final document. Seth responded in the affirmative, but that there was not enough time to find a complimentary way at this time. Seth asked whether the group agreed at this time to move forward to meet objectives.*
- *Vineetha did not think the TWG should move forward at this time and emphasized the need to allow tribal representatives to provide their voice and input. Vineetha pointed out that the group has heard repeatedly from the tribes that they do not feel included. Vineetha's opinion was that moving forward now would isolate an entire group.*
- *Ben Reeder thought the TWG needed to prioritize challenges with the budget and where money would be spent. Ben added that the TWG has been working with tribal concerns but is trying to combine two unrelated issues. Ben stressed the importance of moving forward with the guidance document and allowing the tribes to have a complementary document. Ben stated that the TWG needs to find a way to blend tribal and non-tribal voices, but that timing was a challenge.*
- *Craig stated he viewed the process as dynamic because it was meant to change over time. The guidance document would be a living document that was open to change in the future. Craig suggested moving forward with the hope of finding a better way in the future.*
- *Michelle stated the TWG needed to get something done to help advise the budget, but that there needed to be a way for tribes to have the opportunity to insert their concerns along the way. Michelle suggested developing some graphics that would better interpret tribal perspectives.*
- *Jan stated the document did not appear necessary because the TWG knows what its priorities are. Trying to force the document through in the next couple of months would not tell the TWG more than it already knows. For the guidance document to be useful, all members need to help generate it. Seth pointed out that Jan has a lot of experience with the issue. Jan stated the TWG would need to have an assessment if it was serious about incorporating tribal resources.*
- *Kurt stated the issue of tribal perspective has remained constant since 1997, and that the TWG has allowed western science to dominate the program. Kurt asked the group to be open to the tribal perspective and the tribal relationship to resources to help minimize conflict within the group. Kurt also brought up the psychological and emotional effects on tribes when their perspectives are ignored.*
- *Peggy Roefer stated it was important to have the knowledge assessment and asked if it could be specific to GCMRC. The TWG could then work on something that incorporates more people. Peggy*

questioned why the group could not talk to tribal members who know about these resources for their perspectives. Seth also asked that the group move forward with a GCMRC focused assessment, but with the commitment and/or actual progress on an approach reflective of tribal input. Helen stated that it was a good idea to have different entities fill out the Knowledge Assessment, making judgements on what they each know. Discrepancies in the information would give the TWG the opportunity to engage in further dialogue on why different stakeholders have the ideas they have.

- *Vineetha repeated that she did not think the group should move forward yet. Tribal trips have shown that the relationship between tribes and the river is important. Vineetha stated that she and GCMRC look at the river as something to study, but the tribes view it differently. Vineetha suggested developing a timeframe for a solution prior to moving forward.*
- *Seth disagreed that a timeframe would be useful because of the various steps involved. Craig agreed with Seth and recalled how much he learned from an exchange of ideas he had previously experienced within the TWG. Craig suggested identifying what was missing this time and work to do it better in the next three years.*
- *Cliff Barrett questioned how much involvement tribes have in the process and suggested non-tribal members are doing that work. Cliff asked if it would have been better to get input from the tribes prior to moving forward. Cliff added that tribes need to be more involved and come to the table with ideas to include in the Knowledge Assessment process.*
- *Seth suggested making the Knowledge Assessment western science centric but with tribal involvement.*
- *Jakob suggested allowing the current document to move on with the tribes working on a second document to be implemented later.*
- *Jessica agreed on the importance of incorporating tribal voices and suggested developing potential models to help the group move forward with the Knowledge Assessment and with tribal input incorporated. Seth agreed it was a good idea to move forward and that having someone like David Braun help with blending both perspectives might help.*
- *Richard suggested a formal action item for the tribes to decide whether to approve or oppose the document. Richard stated the NEPA process with public comment might be another option. He pointed out that a lot of times the tribes are not privy to information, but that they should be to get a better understanding of why the government is doing what it does. Seth thought Reclamation might be able to incorporate Richard's ideas.*
- *Cliff stated his ideas were not for consultation after the fact, but to invite the tribes to participate within the team and involve them in the process. Craig agreed that it was important to build those relationships and to have the tribes present and involved instead of having the tribes doing their own thing. Kurt stated the tribes have been involved in various ad hoc groups and have presented their perspectives, but those perspectives are typically marginalized because they are not concerned with numbers. Kurt sensed the group would move forward with the western perspective but thought it was important for him to bring up the issue on behalf of the Pueblo of Zuni.*
- *Theresa stated the process is flawed because it is not reflective of all perspectives. If the TWG moves forward with the document in its current form, the group should add an addendum from the tribes on how to address this issue. Theresa added that tribal leaders appoint representatives to the TWG to represent tribal interests. Tribal representatives are obligated to tribal communities who will use the guidance document as a tool. Theresa did not think two months would be enough time to craft what the group knows should be in the Knowledge Assessment.*
- *Seth expressed discomfort with moving forward without a consensus, and he expressed appreciation for the solutions offered and how those solutions do not address the issues. Seth asked the group if there was an objection to moving forward with the Knowledge Assessment with a western science*

perspective that values tribal points of view and with an explanation that the document does not consider information and knowledge viewed from a tribal perspective. Lee asked the document could be conceptually reframed as an umbrella for western and tribal components that inform the budget and TWP. There were no objections from the group for moving forward.

Training on How to Make a Section 508 Compliant Document

Presenters: Clint Stone, Reclamation

Presentation Summary: Ensuring that documents posted to federal agency websites meet section 508 compliance requirements is important so that information posted on those websites is available to everyone equally. CDC statistics show that 26% of US adults have some type of disability, including disabilities that affect access to digital content. The TWG deals with visual presentations, so there is more emphasis on making visual information available. Section 508 compliance is required by law.

PDF format is a universal file format, which any platform can access, and which has fully accessible functionality built into its format. The five items to consider when building accessible content are content structure, color and contrast, images, charts, and graphs, tables, and links. **Additional details are in Attachment 9.**

Discussion:

- *Craig Ellsworth asked Clint to demonstrate what buttons he used to make a document 508 compliant. Clint brought up the PowerPoint presentation and walked through the steps to check accessibility and how to address warnings and errors. Clint emphasized that errors need to be corrected in order to move forward. Clint also suggested leaving the accessibility checker open while building the presentation in PowerPoint.*
- *Peggy commented that warnings do not go away, even after she has addressed the warnings. Clint responded that the accessibility checker will always show warnings for items that would require a manual check, and that it was okay to move past the warnings after correcting the issue.*
- *Peggy asked how to get rid of the warning for headings. Clint stated that slide headings are tagged as headings and that Microsoft Office assumes those are bookmarks. The issue goes away once the document is converted to PDF.*
- *Clint recommended saving the original files with the accessibility corrections in case changes need to be made later. This will help avoid starting the process from the beginning.*

Discussion of Emerging Issues and Request for Agenda Items for Next Meeting

Presenters: Seth Shanahan, TWG Chair

Presentation Summary:

- Topics the TWG captured from days one and two of this meeting:
 - Discussion regarding the FLAHG charge. John Jordan will provide new text to consider during the annual reporting meeting. Once the new charge addresses the two issues discussed, it will move to the FLAHG and back to the group for any possible objections.
 - Theresa will hold conversations with tribal and federal folks to determine the correct way to address issues.
 - There are opportunities to learn from the water quality, temperature, and dissolved oxygen in the Lake Powell near miss and to track and develop plans for a reaction if this occurs in the future.
 - The Hualapai observed large amounts of sand in the canyon. It is worth discussing the possible drivers, which could be HFEs or elevations at Leak Mead.

- The TWG was not able to accomplish the intended task for the Knowledge Assessment and will follow up with a one-hour webinar on October 28 at 8:00 am. Lee Traynham will send out an invitation with the webinar details and call-in number.
- Seth asked that anyone with ideas for future meeting agenda items submit those to Scott VanderKooi via email by November 5, copying Seth and Lee. Scott will put together a draft agenda with his staff that will likely come out in December.

Discussion:

- *Craig Ellsworth suggested discussion on LSF temperatures and humpback chub growth. Seth stated he was concerned with using the LSF term at this time and suggested using the term “temperature effects on chub growth and recruitment” instead.*

Public Comment

Comment/Discussion:

- *There were no public comments.*

Meeting Adjourned at 2:00 pm

Key to Glen Canyon Dam Adaptive Management Program Acronyms

ADWR – Arizona Dept. of Water Resources	DOIFF – Department of the Interior Federal Family
AF – Acre Feet	EA – Environmental Assessment
AZGFD – Arizona Game and Fish Department	eDNA – Environmental DNA
AIF – Agenda Information Form	EIS – Environmental Impact Statement
AMP – Adaptive Management Program	ESA – Endangered Species Act
AMWG – Adaptive Management Work Group	FACA – Federal Advisory Committee Act
AOP – Annual Operating Plan	FEIS – Final Environmental Impact Statement
ARM – Annual Reporting Meeting	FLAHG – Flow Ad Hoc Group
ASMR – Age-Structure Mark Recapture	FRN – Federal Register Notice
BA – Biological Assessment	FWS – United States Fish & Wildlife Service
BAHG – Budget Ad Hoc Group	FY – Fiscal Year (October 1 – September 30)
BCOM – Biological Conservation Measure	GCC – Glen Canyon Conservancy
BE – Biological Evaluation	GCD – Glen Canyon Dam
BHBF – Beach/Habitat-Building Flow	GCES – Glen Canyon Environmental Studies
BHMF – Beach/Habitat Maintenance Flow	GCT – Grand Canyon Trust
BIA – Bureau of Indian Affairs	GCMRC – Grand Canyon Monitoring & Research Center
BO – Biological Opinion	GCNP – Grand Canyon National Park
BOR – Bureau of Reclamation	GCNRA – Glen Canyon Nat'l Recreation Area
BWP – Budget and Work Plan	GCPA – Grand Canyon Protection Act
BT – Brown Trout	GLCA – Glen Canyon Nat'l Recreation Area
CAHG – Charter Ad Hoc Group	GRCA – Grand Canyon National Park
CAP – Central Arizona Project	GCRG – Grand Canyon River Guides
CESU – Cooperative Ecosystems Studies Unit	GCWC – Grand Canyon Wildlands Council
cfs – cubic feet per second	GSA – General Services Administration
CFMP – Comprehensive Fisheries Management Plan	GSF – Green Sunfish
CMINS – Core Monitoring Information Needs	HBC – Humpback Chub (endangered native fish)
CMP – Core Monitoring Plan	HFE – High Flow Experiment
CPI – Consumer Price Index	HMF – Habitat Maintenance Flow
CRBC – Colorado River Board of California	HPP – Historic Preservation Plan
CRAHG – Cultural Resources Ad Hoc Group	IFF - International Federation of Fly Fishers
CRCN – Colorado River Commission of Nevada	IG – Interim Guidelines
CRE – Colorado River Ecosystem	INs – Information Needs
CREDA – Colorado River Energy Distributors Assn.	KA – Knowledge Assessment (workshop)
CRSP – Colorado River Storage Project	LCR – Little Colorado River
CWCB – Colorado Water Conservation Board	LCRMCP – Lower Colorado River Multi-Species Conservation Program
DAHG – Desired Future Conditions Ad Hoc Group	LTEMP – Long-Term Experimental and Management Plan
DASA – Data Acquisition, Storage, and Analysis	LTEP – Long Term Experimental Plan
DBMS – Data Base Management System	maf – Million Acre Feet
DCR – Department of Cultural Resources	MA – Management Action
DO – Dissolved Oxygen	MATA – Multi-Attribute Trade-Off Analysis
DOE – Department of Energy	
DOI – Department of the Interior	

MLFF – Modified Low Fluctuating Flow
MO – Management Objective
MRP – Monitoring and Research Plan
NAU – Northern Arizona University (Flagstaff, AZ)
NEPA – National Environmental Policy Act
NHPA – National Historic Preservation Act
NNFC – Non-native Fish Control
NOI – Notice of Intent
NPCA – National Parks Conservation Association
NPS – National Park Service
NRC – National Research Council
O&M – Operations & Maintenance (Reclamation Funding)
PA – Programmatic Agreement
PBR – Paria to Badger Creek Reach
PEP – Protocol Evaluation Panel
POAHG – Public Outreach Ad Hoc Group
Powerplant Capacity = 31,000 cfs
R&D – Research and Development
RBT – Rainbow Trout
RFP – Request for Proposal
RINs – Research Information Needs
RIP – Recovery Implementation Plan
ROD Flows – Record of Decision Flows
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
SPG – Science Planning Group
SSA - Species Status Assessment
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 – Technical Work Group
TWP - Triennial Work Plan
UCRC – Upper Colorado River Commission
UDWR – Utah Division of Water Resources
USBR – United States Bureau of Reclamation
USFWS – United States Fish & Wildlife Service
USGS – United States Geological Survey
WAPA – Western Area Power Administration
WY – Water Year