

## **Glen Canyon Dam Adaptive Management Work Group Meeting August 21-22, 2019**

Wednesday, August 21, 2019

**Start Time:** 9:30 am

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

**Facilitator:** Rafael Reyna & Alysse Lareger, EnviroSystems Management, Inc

**Recorder:** Lauren Johnston, Galileo Project, LLC

### **Items for Follow-up**

- Reclamation will send FLAHG membership email to the AMWG email list.
- Seth will add to the October TWG meeting agenda a discussion on bringing tribal considerations early on into the process, possibly through the CRAHG or another AHG.
- Participants will email Seth and Peggy with interest in participating in the FLAHG, or with suggestions on an appropriate charge for the FLAHG.
- Participants will email Emily Omana Smith and Jessica Gwinn to participate in future TMF discussions.
- AMWG members without representation on the TWG should nominate a representative to the TWG.
- Tribes will meet with leadership to discuss participation funding.
- Participants will consider whether it makes sense to schedule the Fall 2020 AMWG meeting in the first week of September instead of August 19 & 20.
- Reclamation will include tribal representation at the November TWP meeting between Reclamation and GCMRC.

### **Motions**

#### **Motion to Approve Minutes from May 22, 2019 meeting**

- Vineetha Kartha moved, Steve Wolff seconded, passed by consensus: To approve minutes from the May 22, 2019 AMWG Webinar, as distributed on Monday August 5, 2019.

#### **Motion to Approve FY 2020 Budget**

- Steve Wolff moved, Jan Balsom seconded, passed by consensus: The AMWG recommends for approval to the Secretary of Interior, the GCDAMP Fiscal Year 2020 budget summarized in the Bureau of Reclamation and Grand Canyon Monitoring and Research Center budget worksheets as presented at the June 11, 2019 TWG meeting.

### **Presentation and Discussion**

Details of the summarized presentations are included in PowerPoints available on the AMWG website as noted in the sections below.

#### **Welcome and Administrative**

**Presenters & Affiliation:** Dr. Timothy “Tim” Petty, Assistant Secretary for Water and Science, Department of the Interior and Secretary’s Designee

### **Introductions and Determination of Quorum**

A quorum was reached with 16 stakeholders represented. Tim welcomed newly appointed and reappointed AMWG and TWG members.

Tim presented the following highlights of the DOI's reorganization:

- New field supervisors have been assigned by the Secretary for the 12 new regions. The field supervisor for the Upper Colorado River will be Alan Mikkelsen.
- The purpose for the reorganization is to make sure all bureaus within the department can communicate with each other and with the Secretary efficiently. The hope is that this reorganization will increase interaction between bureaus and provide a lead point of contact for all bureaus in each region. The number of regions has been brought down from 40 to 12. With the previous organizational structure bureaus all functioned differently and it was unwieldy for the Secretary to stay well informed on the happenings in each region. Creating the 12 regions facilitates the Secretary's ability to efficiently get information quickly.
- Secretary Bernhardt's Secretarial Order on the ESA came out in the past two weeks. Dr. Petty stated he is happy to discuss the nuances of that Order. The media and agencies have been having good interaction and discussion with the Department so far. It's been a two-year process looking at how the ESA is implemented. Especially with respect to Threatened species, the Order looks for a streamlined process to de-list them if criteria exist to warrant de-listing, including across other federal agencies. This impacts a lot of the science and research that happens in the Canyon.

### **Executive Order re: Federal Advisory Committees**

The Secretary has been emphasizing ethics. FACA committees and their members must follow a set of ethics guidelines. Members of a FACA committee must follow these ethics guidelines as they conduct themselves. All DOI employees will be under review by ethics officers centralized within the Department.

There is an existing executive order to review all the 1000+ FACA committees. As the review is ongoing, the appointment and reappointment process is on hold.

### **Progress on Nominations and Reappointments**

The appointments and reappointments made just prior to the March 2019 meeting are available in the meeting notes. There are five new appointments or reappointments. Daniel Picard remains the member for Reclamation. Kathleen Callister is the Reclamation member alternate. Eric Millis is the member for the State of Utah. Robert King is the alternate for the state of Utah. Richard Powskey has been approved as the alternate for the Hualapai Tribe. There are still several nominations in process.

### **Approval of May 22, 2019 Meeting Minutes**

Secretary's Designee Dr. Timothy "Tim" Petty introduced the agenda item and asked if there was any objection to approval of the May 2019 webinar minutes as distributed. Vineetha Kartha moved to approve the minutes. Steve Wolff seconded the motion. Tim Petty asked for any objections. Hearing none, the minutes were approved and shall be added to the record.

### Action Item Tracking Report

- AMWG will consider process for planning next 20 years of LTEMP. What is success? How do we know we are there? OPEN – Target completion date end of calendar year 2019.
  - Develop monitoring metrics – this effort is still in progress and will likely be an iterative process.
  - Streamline AMP documents in LTEMP ROD
    - The first step was to check in with current administration. One presentation after this from Dr. Petty will share further guidance he prepared and finalized this week.
    - Emily and Lee have been reaching out to AMWG participants to learn more about the process in an effort to avoid inadvertently omitting any important aspects of guidance from the past.
    - A next step is to develop the new TWP. Reclamation will be working with TWG to make sure budget development is consistent with Dr. Petty’s guidance and with LTEMP goals and objectives. No new guidance materials are expected. Reclamation is looking to refine what’s already in the LTEMP ROD and other guidance documents.
- Reclamation will send the temperature control paper to the AMWG when it is available. OPEN – target completion end of fiscal year 2019.
  - The Reclamation Technical Services Center is assessing the state of science for temperature control. The work is not yet finished. AMWG is concerned with downstream impacts of temperature control devices. Reclamation intends to hold a prize competition in 2020 to explore new temperature control devices.
- HFE assessments. CLOSED.
  - GCMRC did an assessment of past high flows, including power plant capacity flows. GCMRC presented their initial findings at the 2019 Annual Reporting Meeting. The next step is to identify experimental flow options. This has been referred to the TWG as an additional action item.
- Reclamation will send to the Secretary’s Designee information on the \$95,000 in tribal support. OPEN – no due date set.
  - Tribes have requested an increase in funding support. This money comes from a budget separate from the power revenues budget. The money is collected from appropriated dollars from each DOI agency. Tribes have received the same dollar amount since 1999. Reclamation had conversations back in July to understand this request. Tribal representatives wanted to speak directly with leadership. This conversation will happen this week.
- AMWG Members are invited to contact Sarah Rinkevich if they have interest in attending this summer’s Integrated GCDAMP Stakeholder River Trip. CLOSED.
  - The river trip took place this July. Updates are scheduled for this meeting.
- TWG will identify experimental flow options that would consider high valued resources of concern to the GCDAMP, fill critical data gaps, and reduce scientific uncertainty. OPEN.
  - There will be an update later this week.

The entire Action Item Tracking Sheet is included as [Attachment 1](#).

### DOI Guidance and Action Items

**Presenter & Affiliation:** Dr. Timothy “Tim” Petty, Assistant Secretary for Water and Science, Department of the Interior and Secretary’s Designee

#### **Presentation Summary:**

New guidance was issued August 14, 2019 and distributed via email August 19, 2019. There have been two policy guidance memos in the past. This new guidance memo builds on the previous guidance memos; it does not supersede them. The memo gives an overview that builds on the LTEMP EIS and

ROD, and input from AMWG stakeholders. The memo serves as a reminder of the ROD outputs, and how they interact with interim guidelines and drought contingency plans. The overall goal is to frame the discussions here to explore operational flexibility for hydropower and power plant capacity flows that meet all of the given requirements as laid out in the LTEMP ROD, LTEMP Scientific Monitoring Plan, and the three-year workplan and budget process.

The Secretary's Designee memo is included as [Attachment 2a](#). The Secretary's Designee memo presentation to the AMWG is included as [Attachment 2b](#).

### **Discussion/Q & A**

- Steve Wolff mentioned that there is uncertainty in the budget for long term planning. The sources of funds are still uncertain. It's not known whether they will be appropriated or from hydropower revenues. Steve asked if there have been discussions about how to prioritize what gets addressed given this uncertainty. Dr. Petty answered that there are presentations on the budget later in this meeting. The three-year budget segment allows AMWG to look long term. Reclamation built flexibility into the memo to deal with funding uncertainty. Dr. Petty agreed that a longer-term look, say around 20 years, is needed. Future AMWG presentations will further feed into discussions on how to apply the guidance in Dr. Petty's memo.
- Melinda Arviso-Ciocco expressed interest in continuing the discussion on tribal participation from previous meetings. She asked where specifically tribal concerns are taken into consideration. Where will tribal collaboration and partnerships be taken into consideration? Tribes want to continue to work on how tribal considerations fit into the needs for maintaining dam releases, doing activities to comply with the ESA and NHPA, doing research and monitoring. Dr. Petty agreed it is a goal to implement that language into future guidance documents. Brent Esplin added that Reclamation is looking for opportunities to continue these discussions and to work with the tribes. Lee Traynham added that Reclamation also has the PA and Historic Preservation Plan for guidance on cultural and tribal resources.
- Dr. Petty added that the NHPA compliance is highlighted in the memo. Melinda replied that while NHPA is specific to Section 106, there is a broader general framework for where tribes are coming from in prior discussions, that tribes are also within the trust responsibility with self-determination. Being that tribes are not a minority and are involved as stakeholders, there is also that trust responsibility. Tribes have sovereign nation status. Melinda stated she thinks that is missing. Compliance is one thing. There is also the broader. That is what needs to be addressed.
- Kathy Callister pointed to the ROD section 6.5, and Secretarial order 3342 that asks Reclamation to form partnerships and collaborate with tribes. That's where Reclamation has flexibility.
- Daniel Picard added that for the AMWG, the ROD is very specific to the processes. Reclamation does recognize and understand and is committed to working with tribes in a much broader context. This is specific and limited and Reclamation doesn't want to necessarily limit itself in recognition and interaction that it needs and wants to have. Reclamation is committed to the AMWG process and reiterates here that it does recognize the broader trust responsibility.
- Peter Bungart stated that with the effects of climate change and long-term drought, besides a wet year last year; temperature rise and fluctuation in Lake Powell has caused nonnative species from Lake Mead into the Colorado River system. This is impacting sediment and impacts the Hualapai Tribe's socioeconomic situation. It is timely to consider collaboration between AMWG and the Lower Colorado River Multispecies Conservation Program, and direct more attention towards that, because that does impact the Grand Canyon Protection Act and other laws. Dr. Petty agreed and stated that in the detailed presentations for later today and tomorrow, these more detailed questions can be addressed.
- Kevin Dahl recalled that in the new guidance memo, Dr. Petty mentioned a desire to return the focus of the dam back to its original purpose for hydropower. Kevin stated the original purpose of the dam was not hydropower. However, hydropower was included in the LTEMP as a resource consideration and the group has achieved a good balance. Kevin stated his opinion is that the group needs to go forward from the LTEMP and not look backward.

- Vineetha Kartha asked if there was an opportunity for changes to the guidance memo. Vineetha's legal counsel is reviewing the memo and wants to know how to bring any comments forward. Tim replied there is ongoing opportunity to bring comments forward. The memo includes items to consider for discussion. Reclamation reviewed past guidance memos to ensure continuity and incorporate key concepts. Brent added that while the guidance documents are new, Reclamation is still operating within the ROD. The ROD will always be there. Reclamation is not changing any of that guidance. The key part of the guidance is the ROD is "law of land."
- Vineetha clarified her concern is with regard to the drought contingency plan and the potential for the guidelines to be re-negotiated as early as next year. She just wants to be sure her counsel is okay with that.
- Chris Cantrell commented that moving forward with adaptive management is great. He wanted to mention what is not disclosed is the USFWS Coordination Act and the Colorado River Storage Project Act. Those are two key pieces in managing Colorado River and impacts to species on the Colorado River, including State Trust Species. AGFD would like that evaluation. A difference between the LTEMP and the Modified Low Fluctuating Flow (MLFF) is that there was a USFWS report on the MLFF, but there was not one for the LTEMP. Chris expects there will be more discussion on what species will be impacted. Dr. Petty replied that this might be a good area for relying on TWG for the future for expert analysis.
- Kelly Burke followed up with a reminder that it seemed in the memo there was a reference to GCPA with a focus on research and monitoring; however, there is a broader statement of protecting the downstream resources that is not being incorporated. Dr. Petty replied that this is part of the emphasis for looking at and incorporating past guidance. Reclamation is starting to look at what the group is learning, and then starting to incorporate that into the adaptive management and process in order to work together address impacts. If we aren't giving full attention to a resource, part of the goal of the AMWG is to get that on a list for consideration. There is the flexibility to do that.

## Hydropower from a Regional Perspective

**Presenter & Affiliation:** Carl Monroe, Chief Operating Officer, Southwest Power Pool

### **Presentation Summary**

AMWG had asked for a presentation on the position of hydropower from a regional energy perspective. Carl presented the functions of the Southwest Power Pool (SPP), the advantages of the Power Pool, and future considerations in developing energy generation and transmission. Carl's presentation is included as [Attachment 3](#).

### **Discussion/Q & A**

- Kevin Dahl asked whether the Glen Canyon Dam could be used as power storage, and if it was used for that, how it might impact water allocation in the lower basin. Carl speculated that if the water was pumped back up it could potentially be accounted for in a later allocation.
- John asked about the cost of pumping the water back up versus using it. Carl answered that the energy out of using it again is less than the energy used to pump the water back up. The efficiency issue would need to be accounted for by the cost of the energy. Carl added that this type of storage is too expensive for long term time frames, and it's not possible to store enough to meet long-term energy requirements.
- Leslie James reminded everyone that Carl Monroe is here to respond to David Nimkin's (NPCA) request for a presentation on where hydropower fits in a regional context. Carl added that WAPA is looking into some of the same technologies and resources as SPP. Circumstances are changing in the markets, and power providers are looking at different ways to add value for their customers.
- Kevin Garlick wondered how much control SPP has over hydropower in the system as a whole, and how SPP can control backing off of hydropower when other intermittent resources are available. Carl responded that SPP has control over what the hydro-owner gets into the market. It's a voluntary market, and SPP uses the cost provided by the hydro-owner to determine what gets into the market. What

WAPA has been exploring is finding flexibility within contracts with their customers to see how much flexibility they have. WAPA's flexibility is limited based on the impacts of using that flexibility. The hydro-suppliers in SPP do use dams as storage and generation and try to optimize the value of the water they use by determining when to use it. WAPA is more limited.

- Jan Balsom asked about the diversity and mix of power sources discussed and how Carl expects to see that shifting, and what storage capabilities exist for redistribution. Carl responded that SPP has seen a big shift over the last ten years, and a shift in renewables. SPP has seen a shift to wind because the cost of putting the wind into service and the subsequent wind energy is cheap and lowered by the wind energy Production Tax Credit (PTC). Utilities are investing in wind, and it's a great energy source. The PTCs start tailing off after next year, according to federal legislation. There's a focus on getting wind this year but less interest in the future. Producers are trying to get as much wind they can this year. Solar is becoming more interesting, and there is currently a compounding Investment Tax Credit that states if you build solar and a battery together, you get an even bigger tax cut. Solar is useful right now for peak use. SPP does expect a transition to more solar power on homes. Other power sources, including coal, natural gas, and nuclear, are being retired.
- Peter Bungart stated that in the west there is a lot of more public land and solar facilities are being placed on it. This has environmental and cultural issues. Peter asked how SPP deals with this impact. Carl replied that most land used for power generation within SPP is private, with the exception of land in North Dakota and Oklahoma, which is tribal. Utilities have to work with tribes on that. Carl didn't know off hand what the cost difference was and suspected there were more environmental and other limitations. There are endangered species to consider, for example. SPP only gets involved once the power generator wants to connect into the system.
- To Leslie James' comment, David Brown added that what David Nimkin (NPCA) was trying to get at were overall regional energy strategies. SPP is separate from where this facility operates. The idea is trying to get a regional context for understanding the Glen Canyon Dam facility. David requested a further presentation or input from someone who could add more information as to where this particular dam falls within regional energy.
- Carl stated his understanding is that this dam falls outside of California ISO and other activities. Carl suggested a future presentation of how the operations of this dam might be reflected into the California ISO market. Leslie James added that, amidst rapid change, there are currently two energy imbalance options going on, EIS and EIM, of which California ISO is an EIM. Depending on where you are in the energy market there are a lot of different interests. SRP, Tucson Electric and Power, Public Service New Mexico have gone into EIM, WAPA is considering what to do, Bonneville Power Administration has been going through a process-oriented approach to look into going into the EIM. At some point this group could have someone come talk about markets in this region or across the country. There's a lot of complexity to the markets.
- Leslie added that each hydro facility is unique, and the way it's operated depends on who owns it, who operates it, what RODs are in place, what laws and regulations apply, etc. Members in CREDA all have a portion of the CRSP allocation, but all have other resources as well. These members are dealing with coal, wind, large and small nuclear, etc. CREDA would be glad to have a utility member come talk about resource planning and other requirements.
- Kurt Dongoske asked for insight into what SPP sees as the future for hydroelectric power in the transition to renewables. Intuitively hydroelectric power should be clean, but it emits a lot of greenhouse gases.
- Carl stated that part of SPP's responsibility is to plan 20-30 years in the future for transmission. Utilities do generation. Most people believe more renewables will become available. There's a lot of potential with solar energy. Hydro provides a benefit for maintaining reliability in the transmission system and provides a benefit for what SPP needs to control. Carl hasn't heard of whether people question whether or not hydropower is sustainable or renewable based on greenhouse gases.

- Leslie clarified that Scientific Certification Systems looked at Glen Canyon Dam hydro in terms of a like cycle assessment. Every resource has an environmental impact, but they're not always assessed in the same way. Leslie would be glad to share that particular study.

## Basin Hydrology and Operations

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

### **Presentation Summary:**

Reclamation has been central to the effort of modeling and forecasting with regard to water for drought contingency planning, per an Executive Order from last fall. Reclamation will continue working on the effort.

Snowpack this year is the second highest since the beginning of the drought in 2000. As of August 18, the system has hit peak storage and is starting to decrease. Lake Powell is at 145% of average unregulated inflow for the spring period from April-July. 2018 was the third driest year since Lake Powell started filling, and the fifth driest year in the last 100 years. The beginning of January 2019 started with dry forecasts; however, because of the amount of snow in the area, 2019 has seen the second highest water elevations since water year 2000. Blue Mesa has the highest percentage of unregulated inflow, and Navajo, which has been dry the last 15 years, is above average at 158%. The water projection for water year 2019 is currently at 13.54 maf, which is 125% of average. Reclamation has seen a swing in historic elevations at Lake Powell in water year 2019. Current conditions are similar to those in water year 2017 bringing storage up from the dry year in 2018.

August is a tier determination month. Lake Powell water year forecast for 2020 is currently 10.8 maf, which is 100% of average, and Blue Mesa is at 102% of average. Navajo, Flaming Gorge, and Fontenelle are drier because the Colorado River Forecast Center uses ensemble stream flow prediction for a median value. Because the median hydrology is skewed from average, the beginning of the water year numbers are drier. Reclamation used the August 24-month study projections for January 1 to determine the Lake Powell and Lake Mead operating tier. Reclamation is in the Upper Elevation Balancing Tier for min, max, and most probable operations in water year 2020. The most probable water year 2020 release is 8.23 million acre-feet (maf). The minimum probable water year 2020 release is 9.0 maf, under an April adjustment to balancing based on Lake Mead elevation on September 30, 2020, below 1,075 feet and in compliance with the Interim Guidelines Record of Decision. The maximum probable water year 2020 release is 13.49 maf, under an April adjustment to Equalization based on Lake Powell elevation on September 30, 2020, above the Equalization Tier elevation for 2020 of 3,657 feet.

Glen Canyon has eight powerplant units. The current maintenance schedule caused a change to capacity in acre feet per month. Reclamation worked with WAPA and their consultant to update the calculation method. Reclamation incorporated WAPA's forecasting algorithm into its scenarios and now show capacity into the future based on elevation. There is currently a disconnect between the new algorithm and what Reclamation is incorporating into the 24-month study. Reclamation expects to fix the issue to make it consistent with the 24-month study.

Reclamation originally expected transformer maintenance to take three to four months, but maintenance has been underway for about a year now. Six units will be available throughout water year 2020. Reclamation is coordinating with Glen Canyon to resolve the lack of required annual maintenance. Annual maintenance takes three to four months and will result in times when only four units are available. Reclamation hopes to have at least six units available at the beginning of November for an HFE. Problems with units going out in July caused bug flow patterns to be different than anticipated, but August is looking better for bug flows.

Further details of this presentation are included as [Attachment 4](#).

### **Discussion/Q & A**

- Leslie James asked if the change in the maintenance table due to capacity values was just due to a change in math. Heather explained that Reclamation was using the current capability unit test at the dam to see how much power could be generated out of the current elevation. Now Reclamation is using empirical data from 2009 – 2015 to determine capacity at different elevations. We have the Mid-Term Operations Model going further for a better estimate of what those capacities would be further into the future than the 24-Month Study.
- Leslie followed up asking if there were higher capacity values predicted by the new versus the old model. Heather answered that it depends on the higher or lower elevations. In May, Reclamation was using the May capacity; however, the reservoir rose over 52 feet and was not providing an accurate reading of what those capacities would be in the future. Now, Reclamation has a better estimate at higher elevations or under significant changes in elevations.
- Clifford Barrett asked whether dry years were included in Reclamation's calculations and whether including those would change anything. Heather responded that the Colorado Basin River Forecast Center uses 35 years in its ensemble streamflow prediction model for forecasting, starting in 1981 and through 2015. When looking at, and comparing, averages, Reclamation uses the 1981 to 2010 period of averages because it is consistent with the National Weather Service 30-year period of record. Reclamation does include some of those drier years in the actual estimate of future conditions.
- Tim Petty asked how DCP with hydrology impact AMWG. Heather responded that for the Upper Basin, the elevation at which DCP starts to contribute is 3525, and Lake Powell is above that elevation. For the Upper Basin, DCP looks good.
- Chip Lewis asked how accurate the projections for most probable inflow are. Heather responded that the reason Reclamation looks at 10 and 90 and have 80% probability into the future is because probability of being most probable is limited this early in the season. Moisture conditions are unknown until Reclamation sees snow. Uncertainty continues into February and March 2020. Chip asked whether looking at past conditions could help. Heather responded that it would depend on the month one is looking at and stated she could present that information in the future.
- Chip asked what causes Reclamation to be comfortable with its commitment to release water based on predictions. Heather responded that Reclamation releases water, in one part, because in all three scenarios, the release pattern of 2 maf is the same in October, November, and December. Reclamation reevaluates the release pattern in January, during which time uncertainty is still high but gives Reclamation a better estimate. If Reclamation sees water drop between now and January, Reclamation would adjust the release. Peter Bungart thanked Heather for her response to Chip's question, as Peter had similar concerns.

### **Stakeholder's Perspective**

**Presenter & Affiliation:** Charley Bullets, Southern Paiute Consortium, Kaibab Band of the Paiute Indians

#### **Presentation Summary**

There were 15 bands of Paiute prior to contact and there are now 11. Charley represents two bands, the Paiute Indian Tribe of Utah and Kaibab Paiute Tribe.

Current monitoring work is simple, and there is no long-term database or schematic for tribal monitoring. All tribes observe their surroundings. Now monitoring includes photo matching, transects for vegetation, and water quality. Paiute also monitor the rock writing, using DStretch Photography. Most monitoring is observation. There is a ten-year report available for those that are interested. There have been challenges to science and traditional knowledge incorporation. One concern is with an HFE, there are new beaches coming up at cultural sites.

Monitoring reports are provided to stakeholders to encourage continued funding. Trips alternate youth and adults each year. Charley's involvement with the AMWG today is a direct result of participating on a

youth monitoring trip in the 1990s. The trips are beneficial to supporting youth to come and learn about ancestral ties, and to practice and see oral stories.

With the science that goes on in the canyon, presenting at the Annual Reporting Meeting is important, because the open mindedness of the future generations of scientists will help with adaptive management.

### **Discussion/Q & A**

- Leslie asked if the beach monitoring reports are available. Charley added that this year's report is available via email. There is a DVD available as well. Stakeholders should have this but if not, Charley has them available and can bring them to the next TWG meeting. Helen added that all reports are available on the GCDAMP wiki. Jan added that tribal videos were to be linked there as well. They're great teaching tools. Craig clarified further that on the tribal monitoring reports, there's a cultural page that those are all posted to. The wiki may be the only place. There are a lot of videos on there. Currently there is a Zuni video released to the general public.
- Jan asked how Charley goes about recruiting the next generation of monitors, for example into schools associated with the Paiute Consortium. How far outreaching can you go through the schools to gain interests in next generation? Charley stated that's already starting. One of the students Charley took out ten years ago is a biologist already and there are two more on the way. Charley encourages and wants to invite more "ologists".
- "Youth" is considered to be ages 15-22 for the participation purposes.
- Melinda Arviso-Ciocco asked if all Paiute bands participate. Charley replied that the Utah and Kaibab bands are the only ones signed on. San Juan were supposed to sign on but never did. They didn't participate so their money was taken away.
- Kathy asked what training or educational processes were in place prior to going down the river. Charley replied that there's a meet up at Lees Ferry to go through materials prior to the monitoring trip.

### **Experimental Riparian Vegetation Treatment**

**Presenter & Affiliation:** Mike Kearsley, Wilderness Monitoring Coordinator, National Park Service

#### **Presentation Summary**

NPS implemented an experimental mitigation treatment to help control invasive plant species. The way LTEMP flows were planned has been leading to invasive species and the spread of exotics, which could lead to the long-term decline of native species. NPS has scheduled this pilot project work from 2018 to 2022. The 2019 river mission work included NPS, SWCC, AZCC, and Ancestral Lands crews. The goal was to mitigate for invasive encroachment and to treat for several exotics. Plots were designed and vegetation monitored before and after treatment. NPS plans to go out next May to observe the treatment impacts long term.

Additional details of this presentation are included as [Attachment 5](#).

#### **Discussion/Q & A**

- Jessica Neuwerth asked what kind of maintenance is needed for this work. Mike replied that over time this management will require less maintenance. This effort was a preliminary test.
- Peter Bungart asked where the vegetation goes. Mike replied that the group put the vegetation in the river. There is some chance the vegetation could reestablish downstream, but this is not likely.
- Kelly Burke asked if NPS has been able to compare what the beaches look like now with other camelthorn removals? Mike replied that previous work was organized to treat the vegetation where it was. There was no monitoring as part of that process. NPS does, however, want to come back to the sites treated with this effort.
- Melinda asked if there was any training for this project on the cultural sites that the group was working in and around. Melinda added she is aware the participants received insight into the archaeology but wasn't sure if they received any cultural sensitivity training. Mike responded that there was no cultural sensitivity training, but NPS did get feedback from crews that they would like to know more about this

and the areas they visit as a whole prior to going on the trip. Melinda added that this is a perfect example of some of the areas on the lack of funding. There were presentations on the river trip that emphasized sensitivity for the landscape and the plants and the vegetation and the riparian corridor down to the river. She expressed a desire to continue working on that.

- Mike clarified that the group did not go to any actual cultural sites, and that they were all above the areas where the group worked. Melinda further explained that she knows the archaeological sites were not disturbed, but that the idea that the entire area is a cultural landscape needs to be explained. It's intangible. Navajo and White River tribes have those questions as well.
- Peter Bungart asked if there were opportunities for other tribes to get involved that aren't involved in the ancestral lands group. Mike suggested talking to Jenn O'Neill. Mike explained it is convenient to work with an ancestral lands crews because NPS has agreements in place for a task order.
- Jan Balsom explained that this was a pilot project, based on what NPS is learning about the area. NPS used partnership money this year because there weren't other funds. NPS needs to work on the funding as it's an important component of how to move forward. NPS wants to know how to better integrate and engage with different communities, including getting youth and young adults to be part of these crews, and potentially establish these crews for use on future projects.

## Fiscal Year 2020 Budget and Work Plan

**Presenter & Affiliation:** Seth Shanahan, Technical Work Group (TWG) Chair; Lee Traynham, Chief, Adaptive Management Group, Upper Colorado Region, Bureau of Reclamation; and Michael Moran, Acting Chief, Grand Canyon Monitoring and Research Center

### **Presentation Summary**

#### *TWG*

The "Development of a Budget Recommendation from the TWG to the AMWG" presentation in [Attachment 6a](#).

In previous meetings the process for TWG to determine the recommended budget was approved. AMWG is currently operating under year three of the current budget. The TWG and BAHG consult on any recommended changes to the TWP using Section 2.7 criteria. Funding can be reallocated for a project if it meets a scientific requirement, an administrative need, or meets a new initiative. Craig Ellsworth is the new chair of the BAHG.

This year the major discussions for the budget centered around questions of where the money would be coming from (appropriated dollars or power revenues) and how the potential changes in funding source may impact the Experimental Contingency Fund. Discussion continued about how to schedule it so it's in place when needed. The BAHG and TWG also discussed how to use any funds that may be lost instead of rolled over into the next FY funds.

TWG's third focus was to ensure that groups had the resources they needed in order to continue and address any unanticipated shortfalls or past cuts. TWG determined that it was necessary to recommend reserved capacity for experiments that may come up. Budget discussions will continue over time between TWG and BAHG to reassess needs.

Some sample ideas for additional studies for the experimental management fund include incentivized harvest effectiveness, tribal projects, stock assessment work, eDNA studies, and temperature control investigations. The TWG budget motion has passed and now it's in the AMWG.

#### *AMWG*

The Fiscal Year 2020 proposed budget is presented in detail in the presentation in [Attachment 6b](#).

The current TWP was formally approved by the Secretary of the Interior.

The TWG is currently in the process of checking for changes or revisions needed for the budget in the new iteration. After that AMWG then makes a recommendation to the secretary. In 2019, AMWG is working under the appropriated budget. For 2020 Reclamation requested additional funds. The Energy and Water appropriations bill has not been finalized. There is a draft version in the house that would direct program to be funded by hydropower revenues.

The current proposed budget of \$11.36 million (20% to Reclamation, 80% GCMRC) is similar to the current TWP.

Reclamation is confident that 2020 funding will be passed in full, but it's not yet completed. Slide 6 of the budget presentation in [Attachment 6b](#) highlights funding differences based on appropriated vs. power revenue dollars.

Item C5, experimental management fund, is in place to respond to unpredictable real-time needs. It's based on what Reclamation thinks might be necessary and it's not always fully used. Historically there have been funds leftover. In the past these leftover funds have been moved to the native species conservation fund. The idea of the fund was to have a resource to conserve fish if needed. There was previously had \$1.7 million in that fund. In 2019 following the OMB directive, Reclamation preserved those dollars and did not spend them. The money is still there and will hopefully be available in year 2020. Reclamation will work with the TWG and BAHG to discuss how to use these dollars when they become available.

Cultural resource moneys are very similar to the current TWP. There is another contingency fund, D10, for NHPA compliance, which has been off of the table so far. As a note, Tribal participation is funded with appropriated dollars from each DOI agency.

#### *GCMRC*

Details of the projects included in the GCMRC budget recommendation are included in [Attachment 6c](#).

Project N is new for the new TWP and consists of hydropower monitoring and research. This is in response to a prior action item.

GCMRC expects to be in the new building by June 2021. For 2020 the overhead without the lease will be 16% with 3% pass through. Once the new building is in place, GCMRC overhead will increase to 26%.

A current list of recommended changes to the budget is included in slide 11 of [Attachment 6c](#). GCMRC is not anticipating a CPI increase this year. For the most part all projects should be receiving less funding, but this has been offset with delayed increase in overhead cost.

### Fiscal Year 2020 Budget and Work Plan (continued)

#### **Discussion/Q & A**

- Helen Fairley clarified that nobody at GCMRC got a raise, but rather the increase in funding for salaries allowed GCMRC personnel more time to spend on the GCDAMP work.
- Melinda Arviso-Ciocco mentioned that the socioeconomic budget is \$243,000, used for a single study. The entire participation budget for five tribes is \$475,000. Socioeconomics is almost half of that. This is a huge disparity. Kurt Dongoske agreed with this point.
- Jan Balsom added that Melinda's comment brings to light the problem AMWG has been discussing about the difficulty of shifting priorities. What Jan observes is GCMRC putting whatever funds they have into other projects. This process doesn't allow for an opportunity to make shifts in resource allocation priorities. There are a couple of tribal projects that exist but are not being addressed. AMWG can always do more science, but maybe the group needs to shift priorities. Jan stated that as AMWG starts building the 2023 budget it should start making serious shifts.
- Kelly Burke seconded Jan's comments. What might be helpful is to review the context of how these funds became available and why tribal projects are still not funded this year.

- Vineetha pointed out that the socioeconomic monitoring and research project that Melinda previously referenced is a project to explore tribal perspectives and resource values.
- Mike expanded that the project isn't entirely devoted to that. Another part of that project is the applied decision analysis. Each project has multiple elements or individual work tasks.
- Melinda addressed Vineetha's point stating it is worth understanding which projects are coming from Reclamation as tribal projects. There is a difference in tribal-proposed projects and the GCMRC socioeconomic project. Lucas Bair (USGS-GCMRC) has a permit to talk to tribal communities, but his project was not developed by a tribe and wasn't submitted as a proposal from Navajo Nation. That's the bottom of line of what was discussed yesterday at the federal family meeting, the disconnect with the proposal budgets and TWP, versus actual projects that are coming from tribes. In this specific case, tribes are helping Lucas because he got all of his permits to do the study, but it's not a Navajo project. The tribal chapters are now requesting to know how this project will help the Navajo. The Navajo internal review board process is strenuous, and tribes are wanting to know how this project will be beneficial. That's a disconnect that we have here coming from representing Navajo Nation and seeing how these budgets are carried out.
- Leslie James pointed out that the two elements of Project J came up through the SEAHG. At the time the SEAHG was looking at areas that weren't being addressed, for instance cultural, recreational, and hydropower. Tribal representatives participate in the SEAHG. This group has stated they felt there was a lack of tribal perspectives. The group then came up with surveys to try to bring those perspectives in. Leslie suggested maybe it would help if Lucas Bair (GCMRC) could provide the split between J1 and J2. Michael stated GCMRC can provide the budgeting detail to show this split.
- Kurt Dongoske stated that Pueblo of Zuni have met twice with Lucas and colleagues from Montana. He feels the problem with this study is that it is framed in capitalistic values. As Leslie was saying, it offers trade off analysis. The Pueblo of Zuni feel that if they participate in trade off analysis it would be used against them. The other question the Pueblo of Zuni have is what the group does not understand about "sacred". There is no trade off with sacred.
- Peter Bungart stated he has previously worked with Lucas. Hualapai have participated in a focus group and provided feedback to Lucas, which he then used to modify the survey. There were a lot of questions that dealt with economic implications for trade-offs. Peter worked with Lucas to work on questions that focus on tribal values. Peter feels the study was designed to address that part first. Peter added that Lucas will be coming up at the end of next month to spend a couple of days with other groups.
- Melinda Arviso-Ciocco stated she worked with Lucas on the questionnaires as well and is worried Hualapai will not like the end product. Melinda's understanding is that the template is from the national survey that was given to everyone at some point. That's why it can't be geared to tribes.
- Peter Bungart added that tribes don't look at the resources from the lens of trade-offs. Tribes consider things more holistically. He feels this will likely be born out once the surveys are completed. That's part of what we learn by doing the survey.
- Brian Sadler stated that for the past 30 or so years power revenues have been used to fund the AMWG and it's worked well, but the group is in a different paradigm. Two intersecting factors are an increase in program costs and a decrease in funding. It doesn't make financial sense to be sustainable in the future. The OMB directive further complicates this sustainability. The draft language for 2020 only secures funding for one year. There is risk to funding in future years. It could mean funding environmental programs and giving cash to OMB. It is important for Reclamation and WAPA to get funding for the next ten years.
- Steve Wolff added that federal funding is tenuous and different sources of funding have different rules. Steve recommended considering how to prioritize programs in light of these factors as AMWG plans the next TWP. WAPA and Reclamation are starting those talks. Steve hopes these groups can consider priorities with the AMWG and the Upper Basin together because the funding is all connected.

- Brent Esplin added that Reclamation is trying to figure out future funding. His group is looking at a combination of power revenues and appropriations. Reclamation does need to reassess and set priorities, while recognizing that Congress ultimately decides what to do.
- Vineetha Kartha asked for clarification on Steve's question, wondering if because it's a three-year plan, does it make sense to rethink the three-year budget and go on an annual basis until there is a solution. Because of funding it seems prudent to have certainty on funding sources. Steve clarified he thinks the three-year funding is good, but the group still needs to prioritize legally what needs to be done with the given funds. The group needs to have a plan for different levels of funding. Dr. Petty added that part of the ongoing discussion is working through parts and priorities to figure out a big part of why this group is together. We need to continue to work together. For those participants who want to get more involved, these discussions can happen within the BAHG.
- The purpose of this group discussion is to get a recommendation through AMWG to send the recommendation to the Secretary. To pass the budget, the AMWG will strive for consensus.
- Steve Wolff moved, Jan Balsom seconded, passed by consensus: The AMWG recommends for approval to the Secretary of Interior, the GCDAMP Fiscal Year 2020 budget summarized in the Bureau of Reclamation and Grand Canyon Monitoring and Research Center budget worksheets as presented at the June 11, 2019 TWG meeting.

## Triennial Budget and Work Plan 2021-2023

**Presenter & Affiliation:** Seth Shanahan, Southern Nevada Water Authority, TWG Chair

### **Presentation Summary**

Details of this presentation are included as [Attachment 7](#) to these notes.

TWG's process for starting the new 2021-2023 TWP starts in January 2020 and proceeds as follows:

- January – annual reporting meeting for TWG (may need to consider a meeting longer than three days).
- February – GCMRC meets with tribes and DOI agencies.
- March – initial TWP is developed.
- April - TWG meeting with a draft TWP.
- May – second draft & third drafts of TWP developed.
- June – TWG meets & provides comment on GCMRC/Reclamation TWP.
- July – final draft TWP sent to AMWG for review.
- August – AMWG meets to discuss and approve budget recommendation to Secretary.
- September – Secretary reviews budget.
- October – FY 1 begins under TWP guidance.

### **Discussion/Q & A**

- The Annual Reporting Meeting is scheduled for January 13-15 [sic] in Phoenix, AZ. The overall schedule is somewhat flexible. Leslie James requested that the focus of this meeting be on key questions that this group will need to look at in terms of priorities. David Brown stated the meeting is long and takes a lot of time. He requested TWG work to make the meeting easily digestible and planned out on the front end.
- Kelly Burke requested creating an ad-hoc group focused on how to address bridging tribal projects with how the whole plan gets developed and carry that through this process. Lee Traynham replied that the Cultural AHG is another forum for that discussion. Kelly suggested that having it tied to the budget process might be very useful. Kelly asked if tribes were able to participate in the early meeting between GCMRC and DOI. Lee stated there is an open invitation for tribes to attend that meeting. Seth added

that the CRAHG had been used as a forum for Kelly's suggested discussions in the past, but maybe the process could be smoother.

- Melinda Arviso-Ciocco pointed out that this discussion brings up the past conversation about tribal collaboration and partnership. NHPA Section 106 compliance is one small part. Melinda insisted that the trust responsibility here is vital, and Chip Lewis at the BIA has a role to play in this process by assisting tribal representatives. Melinda stated she would like to be part of following through with collaboration and partnerships in management decision-making.
- Brent Esplin asked tribal representatives how they propose getting more involved in the process. Leslie James added that in the past the CRAHG looked at proposed projects and proposed their own projects as they happened, then fed those recommendations into the BAHG. Melinda clarified her understanding was that the CRAHG was more for the PA but could now be revived. Seth added that Kurt Dongoske had initially proposed to suspend the CRAHG, and that this is a tribal conversation. If tribes want to include a wider audience, then that is fine too. Charley expressed his support for bringing back the CRAHG. Brent concluded the CRAHG could be brought back and its charge expanded. Melinda supported this idea, stating further that Reclamation hasn't followed up with tribes on issues since July, and having a voice through CRAHG and not simply through the TWG would be helpful.
- Peter Bungart stated his understanding of the CRAHG was it was used during the LTEMP and then dissolved. Peter expressed his support for reestablishing the CRAHG, at least for the purpose of developing projects for the TWP. What happens again after that would remain to be seen, and whether there are non-tribal members. Anything that's cultural would have tribal involvement. When we look at cultural resources, there may be projects that are cultural in nature, i.e. supporting native versus nonnative fish, and suitable for discussion.
- Kelly refocused the discussion by stating her intention in bringing up tribal concerns in the budget process was to create a series of bridges in tribal projects and interests. She asserted that AMWG has used these committees in the past, but the issues keep coming up. There needs to be a better way. Seth responded that there are ongoing meetings between tribes and Reclamation already. Lee Traynham added that Reclamation believes generally more dialogue and more communication is necessary. Reclamation started that with a July meeting. Looking forward, Bill Chada has a list of touch points for at least once every month for now until the end of the TWP process. Reclamation is also considering working through other mechanisms, including phone calls or additional meetings. Jakob Maase expressed his support for additional communication mechanisms.
- Jan Balsom noted that CRAHG was suspended because it was committed to the PA, but it became frustrating working through the BAHG and not seeing any of CRAHG's proposals moving forward. It would be a valuable opportunity if there is commitment in this group to reengage from that subgroup. Starting those discussions early would be an appropriate place to do it. Peter Bungart added that another benefit of having tribal and non-tribal partners would be to address any pitfalls sooner rather than later or redirect processes that are unworkable early on.
- Seth stated that someone would need to lead the CRAHG.
- Melinda requested to be a part of the meeting in November with Reclamation and GCMRC. Reclamation committed to tribal participation at that meeting. Melinda further requested a full-time tribal liaison.
- Dr. Petty finalized the discussion by stating the tribes need to come together to identify a leader and a process to move forward. This is a consensus group, and Dr. Petty wants to be sure the group stays within the parameters of its charge.

## Public Comment

### **Discussion/Q & A**

- No public comments received.

Dr. Petty closed the meeting at 4:46 pm.

Thursday, August 22, 2019

**Start Time:** 8:30 am

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

**Facilitator:** Rafael Reyna & Alysse Lerager, EnviroSystems Management, Inc

**Recorder:** Lauren Johnston, Galileo Project, LLC

### Welcome and Administrative

**Presenters & Affiliation:** Dr. Timothy “Tim” Petty, Assistant Secretary for Water and Science, Department of the Interior and Secretary’s Designee

#### **Presentation Summary**

Dr. Petty welcomed everyone and attendees introduced themselves. A quorum was reached with 16 stakeholders represented.

### Stakeholder Updates

**Presenters & Affiliation:** Kirk Young, US Fish and Wildlife Service; Ken Hyde, National Park Service; Rob Billerbeck, National Park Service, Colorado River Coordinator; Chris Cantrell, AZ Game and Fish Department; Rod Smith, DOI Solicitor’s Office.

#### **Presentation Summary & Questions**

##### *Endangered species*

USFWS wrote SSAs for both the Humpback Chub and Rainbow Trout. USFWS is developing a draft rule to recommend downlisting and a 4d rule for both species, but no timeline for completion is currently available. The public will have a chance for review during the 45-day public review period.

##### *NPS Nonnative Species EA*

NPS is working to complete the PA between SHPO and Tribes, which will hopefully be completed by September 6, 2019. The FONSI paperwork is prepared and will, after the PA, be routed through the agency and the Department. Once the FONSI is signed NPS will start planning the incentivized harvest and start planning how to use the other approved tools. NPS did pump water out of the Slough to try to reduce green sunfish but they are back. NPS plans to pump out the Slough and remove green sunfish again in September. NPS has seen indications that brown trout numbers continue to increase. NPS will provide a green sunfish update early in the HFE planning process.

Dr. Petty asked NPS to provide context for the EA as it relates to the LTEMP. Rob answered that the EA was started because NPS noticed an uptick in green sunfish and brown trout and wanted to explore additional tools beyond the LTEMP to manage these and other nonnative species in NPS units. NPS initiated this process and developed a tiered management approach to address concerns related to management-intensive tools. NPS hopes this approach helps address, in particular, tribal concerns on intensive species management.

John Jordan recalled that at the time the EA started there was direction from DOI to move at an accelerated process. The original timing is about a year behind now, but in the document there were time sensitive cut off dates related to trout management controls. John would like assurance those will be shifting along with the final ROD timing. Rob replied that NPS set thresholds for tools and time periods and is intending to give full timelines. NPS had to bump back some timelines. It really all depends on what happens with the resource. Unless something shifts dramatically NPS fully intends to start the incentivized harvest. NPS wants to work with AGFD on this. NPS is excited to get started with incentivized harvest and evaluate it with GCMRC.

### *AGFD Rainbow Trout Stocking*

AGFD has stocked 6500 rainbow trout into the walk in area of Lees Ferry. Five hundred were stocked last year in November and 6,000 were stocked this year. They are PIT tagged. There is a reader at 30 mile for the PIT tags. AGFD also implemented a persistence study with 100 sonic-tagged rainbow trout. For the most part the fish stay around where they were stocked. Out of the hundred sonic-tagged fish, it appears that there are only a handful left. The creel study will look at catch rates and determine our influence, satisfaction and catch. AGFD hosted a free fishing day clinic with the tribes. Local anglers offered to pay for annual licenses for youth that attended. Ten to fifteen youth attended and received the license. AGFD got positive feedback about the engagement and is considering doing it more frequently.

AGFD has compliance for stocking through the end of this year. All indications are that the fishery is recovering on its own. AGFD's whole intent is to make it thrive. There are no continuous stocking plans in place. AGFD does want to do longer term stocking compliance in case of issues or threats, i.e. dissolved oxygen. AGFD is studying the best ways to stock.

John Jordan thanked AGFD for this action and everyone who supported it. Chris Cantrell thanked all partnerships that made it possible.

### *Current Guidance Memo for DCP Implementation in the Upcoming Negotiations for Interim guidelines*

In 2007, there were plans for shortages based on what Reclamation knew at the time. However, based on water levels and runoff the risk of shortage seemed unacceptably high. Drought Contingency Planning (DCP) is one way to abate this shortage. Commissioner Burman led this charge. The results of this push are public law 116-14 and agreements for a DCP. The DCP agreements were signed on May 20 at Hoover Dam. For the Upper Basin there are additional options for how state-based water conservation programs might work and how the water can then be added to federal storage. There is a process in place to keep an eye on lake levels at Powell. There is a process in place for folks to talk to get water from upper CRSP facilities and down into Powell. There is a similar conservation focus in the Lower Basin. There are more tools there to get level of Lake Mead propped up.

The next step is to implement these DCPs and learn from them. The 2007 guidelines expire in 2026. No later than the end of 2020, DOI needs to start an evaluation of what to do after 2026 on a macro level. This includes how to schedule releases. While this is in play all stakeholders need to be mindful of interactions between the Upper and Lower Basins.

Leslie James requested additional information on the FLAHG. This is an agenda item for later in the day and can be discussed then.

Dr. Petty requested that participants let Lee know if there are any action items from these topics today.

## 2019 Integrated Stakeholder River Trip

**Presenter & Affiliation:** Theresa Pasqual, Joint Tribal Liaison for the Glen Canyon Dam Adaptive Management Program

### **Presentation Summary**

The River trip began on July 24 with networking discussions in Flagstaff and lasted for nine days. The trip down the river required work as a collective. This form of interaction is critical to this program on the AMWG. Theresa posed the following question to all participants, whose answers are included below:

*How do you plan to use these experiences on the river in your work in this group?*

Brent Esplin stated that altering conditions between Glen Canyon Dam and the Hoover Dam is inevitable but wanted to know more about how to mitigate these impacts. It was helpful to talk directly with stakeholders with different perspectives and their alternatives for mitigation. Brent stated is overall message from the trip was that Reclamation and AMWG have to look at areas where there is flexibility,

and potentially create more flexibility, to meet national critical needs but also address the other stakeholders' concerns.

Melinda Arviso-Ciocco recalled that each time she goes down the river is a new experience. She appreciates comments around the needed flexibility, creativity, and openness needed within agencies, tribes, and nations to manage the resources as a fluid environment. Melinda took home new oral histories from other tribal members, including Richard Begay, and ideas for recommendations for AMWG and tribal communities surrounding the river.

Jan Balsom helped facilitate conversations on the trip, and stated every trip is unique and the river and canyon impact everyone who interacts with it. This is crucial to understanding the flexibility in the system.

Kevin Garlick stated that the trip helped widen his view of the whole system and his interests in it. His interested started as simply power generation and costs but have moved to include other perspectives. Kevin expressed his appreciation for being able to participate in the trip and emphasized the importance of flexibility within operations.

Michael Moran had only previously been down the river for a work trip and was happy to see several areas he had heard about but never experienced. He expressed his gratitude for deep and thoughtful conversations along the river.

Peggy Roefer presented what she learned about the tribes and tribal perspectives associated with the Grand Canyon. The details of Peggy's presentation are included as [Attachment 8a](#), to these notes. Additional photographs shared by Craig McGinnis are included in [Attachment 8b](#).

#### **Discussion/Q & A**

- See discussion, Q & A in the following section.

### **Joint Tribal Liaison Report**

**Presenters & Affiliation:** Sarah Rinkevich and Theresa Pasqual, Joint Tribal Liaisons for the Glen Canyon Dam Adaptive Management Program

#### **Presentation Summary**

Tribal representatives requested a meeting on their own. There are a number of issues on the budget and in the TWP that impact tribal budgets and colleagues. Some of the issues that came up in the discussion was the need for increased funding and participation.

In July 2019 Reclamation spoke with the tribes to talk about cultural resources management. Tribal representatives and Sarah and Theresa also attended. The following topics were discussed:

- What meaningful consultation is, and the difference between consultation and collaboration. There is a legal requirement by federal agencies to do consultation, but tribes want to review what that looks like. The consultation is a series of conversations. This goes into the definition of collaboration. Federal agencies need to engage in consultation but want to do that in a spirit of collaboration. This is a challenge because of complexity of consultation that occurs, and the complexity of history between consulting parties.
- Western Science versus resource stewardship and the conflict of values that occurs. These include the challenges of trying to understand one another and the different priorities each group has. Priorities, and where conflict arises that can be avoided. Reclamation did a great job of covering program funding and what reporting requirements need to be covered before funds are distributed to tribal programs. Sometimes there is a disconnect between accounting between tribes and Reclamation. Communication needs to occur at all levels to ensure everyone is on the same page and can be effective and efficient.

- Budget Section D updates, issues and concerns, and planning for the new TWP. Tribes are hopeful that these discussions will help tribal communities be more proactive and less reactive.

Theresa added the following information regarding the river trip:

The nine-day river trip, with participants representing Hualapai, Paiute, Zuni, Navajo, and Hopi, and other federal and state agencies. Topics covered included indigenous perspectives, humpback chub, issues at the confluence, cultural versus western values, vegetation, riparian areas, rehabilitation of some areas, endangered and invasive species in the context of wildlife and insects. WAPA shared values and goals of their organization. Discussions also centered on HFEs, hydrology, and sediment. With a budget of \$40,000, the trip inspired AMWG member participation and understanding and produced an official debrief for management.

An outline of this presentation is included as [Attachment 9](#).

### **Discussion/Q & A**

- Participants appreciate Councilman Kucate's participation and his insight into how everything is linked. This allowed the group to work on strategies for tangible and intangible resource management. He brought the knowledge to the river trip.
- Arden Kucate from Pueblo of Zuni stated that tribes recognize who holds the power in decision making. All the tribes can do is appeal to participants' heartstrings to understand how these places are important. The tribal hope is that sharing cultural perspectives will help people understand and change perspectives.
- Tribal liaisons have a unique challenge of working with tribes, management, and other stakeholders. This is a learning environment for the liaisons as well. The product of that work is continued cooperation with tribes. There are times when the conversation becomes difficult and need to be facilitated. The liaisons appreciate everyone working together.
- Sarah will be leaving as of October 1. Started in November 2012. She is grateful for the opportunity and will be continuing her work with the USFWS on traditional ecological knowledge and endangered species. Sarah expressed interest in tribal youth programs.
- Dr. Petty added that the Office of Water and Science will review Sarah's position to see how it and the Joint Tribal Liaisons program will move forward. It is part-time and funded out of the Department of the Interior.

## Potential Water Year 2020 Experiments

**Presenters & Affiliation:** Emily Omana Smith, Biologist, Bureau of Reclamation

### **Presentation Summary**

Reclamation strives to include effective communication and consultation in implementing experiments with a goal to meet various resource goals under an adaptive management system. Potential experiments for Fall include a regular Fall HFE (up to 96 hours) or an extended Fall HFE (97-192 hours). Potential experiments for Spring-Fall 2020 include a Spring HFE, a Proactive Spring HFE (limited to 24 hours at first, then up to 250 hours), a Trout Management Flow, a Macroinvertebrate flow, a Fall HFE, or an extended Fall HFE. There can be no Spring HFE in the same year as an extended Fall HFE. There can be no proactive Spring HFE in the same year as a sediment-driven Spring HFE.

Sediment modeling will begin soon after the AMWG meeting, and any Fall HFE would be possibly implemented in October to November. Although there are units down within the dam, capacity in CFS runs around 20,000 – 21,000 during the times Reclamation could consider HFEs. This, plus about 15,000 cfs from the bypass tubes give the potential for ~35,000 cfs release.

Bug flows were implemented in 2018 and 2019. Positive results were reported by GCMRC in 2018, and we will hear more about preliminary 2019 results later in Mike Moran's talk, GCMRC has advocated for a three-year experimental cycle.

Stakeholders have been concerned whether we know enough to implement a TMF should one be recommended. In the summer of 2019 DOI technical representatives were consulted on what compliance is available and what information needs are regarding TMFs. Reclamation's next step is to initiate formal consultation with Tribes, then reach out to a broader stakeholder group. Jessica Gwinn and Emily are working on facilitating the discussions and plan to have the next discussion on September 24. Interested persons are invited reach out to Jess or Emily to participate.

Spring Power Plant Capacity flows are another potential action. The maximum non-experimental flow release is 25,000 cfs per LTEMP ROD.

Details of when each experiment will be decided, implemented, and how it might be triggered, are included in the presentation in [Attachment 10](#).

#### **Discussion/Q & A**

- No discussion or questions received.

### TWG Chair Report

**Presenter & Affiliation:** Seth Shanahan, Southern Nevada Water Authority, TWG Chair

#### **Presentation Summary**

Details of Seth's presentation are included in the presentation at [Attachment 11](#).

Seth corrected his prior statement and clarified that the Annual Reporting Meeting and the TWG meeting to follow take place on January 12-14.

TWG focuses on the same issues as the TWG and has seen several similar presentations, and feeds recommendations to AMWG. In the June meeting TWG reviewed the Knowledge Assessment process and how it can be used to measure potential future experiments and environmental management actions. These discussions are ongoing.

TWG discussed Powerplant capacity flows but did not discuss other experimental flow concepts due to the length of discussion of the capacity flows. This discussion included expert input from GCMRC staff. TWG wants to continue a conversation on other experimental flow concepts through the Flow Ad Hoc Group. This is all still in the planning stages. Peggy Roefer has volunteered to be the chair of the FLAHG. Seth has distributed a draft charge for the FLAHG, but it is still in review. The draft charge items are listed below.

- Develop spring hydrographs that might benefit LTEMP biological resources
- Comply with existing rules
- Evaluate, using the knowledge assessment, outcomes to the biological resources and food base.
- More charges envisioned; i.e. additional work is envisioned for the future. We can then look at all of the other resources that weren't considered in this first place.

Seth invited meeting attendees to email Peggy and Seth with any edits to the draft charge or with interest in participating in the FLAHG.

#### **Discussion/Q & A**

- Brian Sadler commented that the two-step process of considering first biological and then other resources might preclude working towards win-win projects. Brian added he is struggling to think about how TWG would look at all resources at the same time to find win-wins. Brian's second question was how the FLAHG would operate with the technical team that Reclamation oversees in making the budget. Seth replied that the hope is to construct the hydrographs with everyone in the room, and with some internal trade-off analysis already completed. Seth stated he is open to working this out and looking at how to get these trade-offs in quantitative terms.
- Emily Omana Smith added that the idea of doing a powerplant capacity flow is rooted in that that type of flow is within normal operations, up to 25,000 CFS. Lee Traynham added that the FLAHG it's a

special setup to consider this idea that was not part of LTEMP. This new process was created out of a need for looking at how powerplant flows could be used, and what additional work is needed to use them properly. Once the FLAHG group comes back with consensus, that's when Reclamation will then move over to a formal LTEMP process.

- John replied he is encouraged by this change and considering other resources in designing the flows. Seth added that TWG needs experts on these resources to develop this process, and then AMWG will take the result and make decisions.
- John wondered if more direction from DOI was needed to enforce TWG's ability to ask agencies to look at these options and allow TWG to coordinate on the level needed. Seth replied that GCMRC has already offered to look at this issue, and Lee stated that the guidance to consider power management flows is explicit in the memo. It's a priority for Reclamation.
- Seth further added that TWG does not think about policy decisions. TWG considers technical aspects. TWG is sensitive to having conversations that might add policy pressure.
- Jan Balsom commented that NPS is invested in this and specialists are engaged. This work is relevant to the Grand Canyon Protection Act which impacts GLCA and GRCA.
- Kelly Burke noted that it would be also important to look at other impacts of power capacity flows in impacting a real Spring HFE. Seth responded that it's premature to have that conversation on a technical level. Lee added that it's Reclamation's first priority to implement a Spring HFE due to sediment or proactive trigger. Reclamation has a better understanding now that the Spring HFE is less likely than initially thought. Reclamation still wants to test it with this surrogate idea. This is the best option backup plan. Kelly agreed but added that GCWC does not want to see a power capacity flow reduce the possibility of a Spring HFE.
- John Hamill added that Larry Stevens (GCWC) pushed this issue to address concerns about the apparent correlation between fall HFEs and the growth of BT populations in Lees Ferry. John's group still thinks it's a viable hypothesis that something in the Fall promotes spawning success. Doing HFEs exacerbates the problem of BT. The other reason Larry pushed this is that Spring Flows are the norm for floods in the Colorado River System. Spring HFEs were added as a possibility because of the potential for a good biological impact. As written initially these HFEs could only be triggered with sediment. The group is now learning that a sediment triggered Spring HFE is not likely. Further, the prospect of a 24-hour HFE for equalization shows no biological consideration. There's a lot of thought that needs to go into appropriate timing and duration of a potential Spring HFE to get a biological benefit. John supports looking at Power Plant Capacity flows but there may be other adjustments, such as the accounting period, that could be adjusted to allow for more Spring HFEs. So, if it turns out that BT are really being helped by Fall HFEs, we can adjust for that. John asked that the focus not be centered narrowly just around capacity flows, but also consider biological concerns to maximize benefits. John's hope was that there are options to adjust the LTEMP to do what science suggests.
- David Brown requested an extension for FLAHG participation. The deadline is changed to two weeks from this Friday.
- David Brown agreed with John Hamill's points. There are issues with the accounting period and the likelihood of a Spring HFE. This issue needs to be considered in the realm of adaptive management and shouldn't be limited to stay within a box.
- Rob Billerbeck recalled that LTEMP did consider alternatives and Spring HFEs were fully considered. Alternatives, including a more naturally patterned alternative, were dismissed due to negative impacts to resources. Remember that LTEMP took five years of analysis. This analysis needs to be reconsidered with fresh eyes and flexibility but also with an appreciation for why certain ideas have been dismissed.
- Jessica Neuwerth also mentioned that stakeholders worked many years refining alternatives, analyzed many different points, and established guardrails. Jessica would like to see AMWG fully explore what's in the guardrails prior to moving beyond them. Parameters are established for a reason. Exploring flexibility within parameters is a great start.

- Vineetha Kartha mentioned that there is a Biological Opinion that looks at impacts of equalization flows. The proposed powerplant capacity flows are part of operations and not an experiment. These flows are management actions and cannot use the bypass tubes. It's important to note the distinction.
- John Jordan requested to be invited to the TMF discussions. Emily Omana Smith formally extended an invitation to recreational fishing. The federal family approach in the beginning was to get a handle on compliance. The September meeting is for all folks that may be interested.
- Peter Bungart asked if any of the flows has the potential to impact Hualapai tribes down in the Western Grand Canyon. Hualapai would like to be more involved in those discussions to make sure those impacts are considered. Several parties noted they did not receive the solicitation for further FLAHG discussions and would like to be involved. Seth committed to sending the email to the AMWG list. Lee Traynham encouraged AMWG members to nominate a TWG representative.
- David Brown pointed out that the message he received was that Fall HFEs do not offer a lot of beach building. There was a lot of analysis that went into that, but that's not the result of the HFE. Michael Moran countered that photographs show some sandbars show improvement, and there is initial gain followed by erosion. There is also evidence of incremental sandbar increase over time. Jan Balsom added that she has observed increase in a lot of places, and the and that increases are cumulative over time. This may be reflected in thickness of the bars and not necessarily their outward size. Melinda added that on the Navajo side of the river there were definitely new areas and change.
- Chris Cantrell supported the FLAHG idea as a good forum for TMF and HFE discussions and will reserve opposition to those flows until the FLAHG has time to consider options. Emily encouraged Chris to participate in the TMF discussions and planning.
- Kelly Burke reminded the group that LTEMP is still an adaptive management program, testing a hypothesis that LTEMP is based on. The group needs to engage new learning moving forward
- Leslie stated that this conversation underscores the need for monitoring metrics and objectives. At the AMWG a year ago, Jayne Harkins recommended monitoring metrics and objectives be developed. Seth encouraged participants to come up with their ideal objectives and metrics to share with AMWG.
- Dr. Petty added that different agencies and bureaus have their own guidelines. Adaptive management means being able to explore options within the range provided by these guidelines, but not all groups have flexibility in the same areas. There needs to be flexibility and creativity within given parameters. Reclamation also needs to know what each stakeholder's goals are to make sure AMWG knows what it's looking for and how to measure it, and then how Reclamation can apply that to decision-making. This group is fully engaged in this process, unlike some other basins, and that's a positive thing.

## GCMRC Science Updates

**Presenter & Affiliation:** Michael Moran, Acting Chief, GCMRC

### **Presentation Summary**

Details for each project presented at the meeting are included in [Attachment 12](#). Michael noted the USGS-GCMRC website is available for additional details, and scientists are available to take phone calls for more information.

*Project A highlights: Streamflow, Sediment Transport, and Water quality* - Currently there is not enough sand to trigger an HFE, however this could change prior to closing the accounting window.

*Project B highlights: Sandbar and Sediment Storage* - Photo evidence shows good sand building right after the HFE. In the long term, results are variable, but the most change is seen in the larger sandbars. Most gain from a Fall HFE is lost by February of the next year. Erosion makes it difficult to maintain these gains.

*Project C highlights: Riparian Vegetation and Monitoring* - Vegetation Monitoring Protocol was published in 2018. Methods published are applicable in other systems. Data from *Durning et al 2017*, showing estimates of vegetation data, are being used in several analyses.

*Project D highlights: Monitoring Effects of Dam Operations on Archaeological Sites* – Dune field storage increases cumulatively as a result of HFEs. Wind then deposits more sand. Removing vegetation may supply more available sand for dunes and sandbars. GCMRC is monitoring this at several vegetation removal sites.

*Project F highlights: Aquatic Invertebrate Ecology* – This project includes Citizen science light traps for midges and caddisflies. The observed increase in capture rate is potentially due to the Bug Flows. Sticky trap data from 2018 midge emergence showed a large increase. There is also higher emergence on the weekends when comparing week/weekend flows. Bug flows are currently ongoing. The bug flows for this year have weekend flows 750 CFS higher than during the weekday lows.

*Project G highlights: HBC Population Demographics* - HBC population appears stable in 2018; average adults and subadults are increasing in the LCR. The subadult population is still above the trigger level for more management actions. The decreasing number of 0+ year fishes could signal a future decrease in adults. When translocated above Chute Falls and LCR, HBC do better. There appears to be an increase in HBC population below LCR.

*Project H highlights: Salmonid Research and Monitoring* - Population and condition factor in trout appear to be stable. The lower 2017 population and condition factors in the JCM reach improved in 2018. The Catch rate is above one fish per minute in Lees Ferry. Smaller fish are starting to recruit into the older population as of 2018. At Lees Ferry the BT CPUE has gone up. More sampling is scheduled for later this year. As of 2019, BT populations are not producing as many smaller fish as in 2016.

*Project I Highlights: Warm Water Native and Non-Native Fish* - There are a lot of channel catfish in the Little Colorado River. The population is likely very large. Most of the fish are large adults. The impacts of this is not very well understood. GCMRC is trying to determine how piscivorous these fish are.

*Project J highlights: Socioeconomic Resource Values*- The Navajo surveys are completed, and the Hualapai surveys should be completed in September. The Applied Decision Analysis portion of this study tries to analyze risk versus actions that we take, for example modeling management actions towards RBT in response to HBC numbers. GCMRC is currently applying this to efficacy of TMFs.

*Project K Highlights: Geospatial Science and Technology* – GCMRC is developing a new database and IT capacity for modeling, including cloud storage data, and an internet of things pilot project. This is using modern cell phone technology to have sensors connect to cell phones in order to get data in real time and to manage and communicate with data and sensors, respectively.

The new GCMRC website is at [usgs.gov/centers/sbsc/gcmrc](https://usgs.gov/centers/sbsc/gcmrc).

#### **Discussion/Q & A**

- There is no progress on Project N to report so it is not included. Lucas Bair has started some of it, but it is still preliminary. Lucas is considering how different energy uses affect the total carbon emissions, etc. Leslie asserted that the SEAHG was not aware of this project.
- Brian Sadler asked if the BT increases should be concerning. Michael replied that modeling based on the raw data has not been completed. He is not a fish biologist and should not speculate. Kirk Young added that USFWS is aware of the increase and is monitoring it. Trout levels aren't as high as in 2014 but right now it hasn't shown its effect in HBC populations. Yakulic's research on how RBT effects HBC seemed to show a temperature component. USFWS is looking into that.
- John Hamill asked if there were any more translocations of HBC into tributaries planned for this year. Jan Balsom updated that there are plans for translocations Havasu Creeks and Bright Angel Creeks within NPS jurisdiction. Kirk Young added that there are plans for additional translocations in the LCR. Groups are working together to look at the positives of that. So far there appears to be a net benefit of moving fish.
- Peter Bungart asked if the channel catfish in LCR are a threat to HBC recruitment and, if so, if there was a plan of action in place.

- Michael stated that he discussed this with David Ward, who was concerned about this impact. HBC numbers seem to be good in the LCR right now but that could change. David is doing lab work to determine how piscivorous they are, and they appear to be quite piscivorous. Kirk added that channel catfish have been known in the LCR for 40 years. They are undoubtedly eating chub. It could be, if HBC aren't habitat limited in another way, that if the population of channel catfish is reduced, the HBC population could increase.
- David Brown pointed out that the latest data for sediment indicated that in February the gains from the HFEs disappeared. Michael stipulated that more data will be collected over the next sandbar monitoring trip in September.

## Final thoughts and Public Comment

### **Presentation Summary**

- Peter Bungart asked if River Trips would continue. Lee Traynham replied in the affirmative. Brent Esplin encouraged participation in the river trips and to keep tribal perspectives in mind.
- Lynn Hamilton asked if past guidance memos were captured anywhere. Craig Ellsworth noted they are on the wiki, linked on the page titled "DOI Direction". Lynn followed up with thanks for maintaining the wiki, especially in light of FACA committee review.
- Lynn mentioned that Peter Bungart and Loretta Jackson will be speaking tomorrow night at the Klein Library at NAU. Their talks will focus on the Hualapai Tribe and its ties to the Grand Canyon. Klein library will be recording the talks. Lynn offered to share the video link with AMWG.

## Wrap-Up

**Presenter & Affiliation:** Dr. Timothy "Tim" Petty, Assistant Secretary for Water and Science, Department of the Interior and Secretary's Designee

Important dates:

- February 12 & 13, 2020 – AMWG in-person meeting.
- May 20, 2020 - Webinar
- August 19-10, 2020 AMWG in-person meeting. Note: this is first week of school. Reclamation is looking for feedback from interested folks on whether it would be easier to have the meeting on September 3-4, 2020. Please consider sharing your preference with AMWG.

Meeting Adjourned at 2:16 pm

## Meeting Attendees–Wednesday, August 21, 2019

### AMWG Members, Alternates, and Leadership

Melinda Arviso-Ciocco, Navajo Nation  
Jan Balsom, NPS-GRCA  
Clifford Barrett, UAMPS (webinar)  
Eric Bobelu, Pueblo of Zuni  
David Brown, GCRG  
Kathleen Callister, Reclamation  
Chris Cantrell, AGFD  
Brent Esplin, Reclamation and Designated  
Federal Official  
Kevin Garlick, UAMPS  
John Hamill, IFFF/Trout Unlimited  
Leslie James, CREDA

John Jordan, IFFF/Trout Unlimited  
Vineetha Kartha, ADWR  
Chip Lewis, BIA  
Eric Millis, UDWR  
Timothy Petty, DOI and Secretary's Designee  
Daniel Picard, Reclamation  
Brian Sadler, WAPA  
Warren Turkett, Colorado River Commission of  
Nevada (webinar)  
Steve Wolff, State of Wyoming  
Kirk Young, USFWS (phone)

### USGS/GCMRC Staff

Lucas Bair (webinar)  
Laura Durning (webinar)  
Helen Fairley  
Paul Davidson (webinar)

Ted Kennedy  
David Lytle  
Michael Moran  
J Sankey (webinar)

### Bureau of Reclamation Staff

Tara Ashby  
Chuck Bench  
Bill Chada  
Kathleen Callister  
Emily Omana Smith

Heather Patno  
Alex Pivarnik  
Shana Tighi (webinar)  
Lee Traynham  
Christopher Watt

### Interested Persons

Rodney Bailey, WAPA  
Rob Billerbeck, NPS- Colorado River  
Coordinator  
Rachel Bryant, WAPA  
Charley Bullets, Southern Paiute Consortium  
Peter Bungart, Hualapai Tribe  
Kelly Burke, GCWC  
Danielle Carmon, NPS-GRCA  
Winkie Crook, Hualapai Tribe  
Kevin Dahl, NPCA  
Kurt Dongoske, Pueblo of Zuni  
Craig Ellsworth, WAPA  
Jessica Gwinn, USFWS  
Lynn Hamilton, Grand Canyon River Guides  
Michelle Garrison, Colorado Water  
Conservation Board  
Jeff Humphrey, USFWS  
Ken Hyde, NPS-GRCA  
Lauren Johnston, Galileo Project, LLC  
(notetaker)

Arden Kucate, Pueblo of Zuni  
Alyse Lareger, EnviroSystems Management,  
Inc (Facilitator)  
Sarah Larson, Upper Colorado River  
Commission  
Kenneth Mayer, Colorado River Commission of  
Nevada  
Jakob Maase, Hopi Tribe  
Scott McGettigan, UDWR  
Craig McGinnis, ADWR  
Carl Munroe, Southwest Power Pool  
Jessica Neuwerth, Colorado River Board of  
California  
Peggy Roefer, Colorado River Commission of  
Nevada  
Dave Rogowski, AGFD  
Theresa Pasqual, Joint Tribal Liaison  
Bill Persons, Trout Unlimited  
Rafael Reyna, EnviroSystems Management, Inc  
(Facilitator)

Sarah Rinkevich, DOI Water and Science, Joint  
Tribal Liaison  
Peggy Roefer, State of Colorado  
Melissa Sevigny, KNAU  
Woody Smeck, NPS-GRCA

Rod Smith, DOI Solicitor's Office  
Seth Shanahan, SNWA  
Billy Shott, NPS-GRCA  
Erik Skie, Colorado Water Conservation Board

### Webinar Attendees

David Braun, Sound Science  
Paul Harms, State of New Mexico  
Ryan Mann, AGFD  
Tim Pierce, KCPW  
Shana Tighi, Reclamation  
Warren Turkett, Colorado River Commission of  
Nevada

Linda Whetton, public  
Eric Witkoski, Colorado River Commission of  
Nevada  
Jeffrey Woner, KRSaline

## Meeting Attendees, Thursday, August 22, 2019

### AMWG Members, Alternates, and Leadership

Melinda Arviso-Ciocco, Navajo Nation  
Jan Balsom, NPS-GRCA  
Eric Bobelu, Pueblo of Zuni  
David Brown, GCRG  
Kathleen Callister, Reclamation  
Chris Cantrell, AGFD  
Brent Esplin, Reclamation and Designated  
Federal Official  
Kevin Garlick, UAMPS

Leslie James, CREDA  
John Jordan, IFFF/Trout Unlimited  
Vineetha Kartha, State of Arizona  
Chip Lewis, BIA  
Timothy Petty, DOI and Secretary's Designee  
Daniel Picard, Reclamation  
Brian Sadler, WAPA  
Steve Wolff, State of Wyoming  
Kirk Young, US

### USGS/GCMRC Staff

Lucas Bair (webinar)  
Helen Fairley  
Tom Gushue  
Ted Kennedy  
David Lytle

Michael Moran  
Jeffrey Muehlbauer

### Bureau of Reclamation Staff

Tara Ashby  
Bill Chada  
Emily Omana Smith

Alex Pivarnik  
Lee Traynham  
Christopher Watt

### Interested Persons

Rodney Bailey, WAPA  
Rob Billerbeck, NPS- Colorado River  
Coordinator  
Rachel Bryant, WAPA  
Charley Bullets, Southern Paiute Consortium  
Kelly Burke, GCWC  
Winkie Crook, Hualapai Tribe  
Kevin Dahl, NPCA  
Michelle Garrison, Colorado Water  
Conservation Board  
Jessica Gwinn, USFWS  
Jeff Humphrey, USFWS  
Lauren Johnston, Galileo Project, LLC  
(notetaker)  
Alysse Lareger, EnviroSystems Management,  
Inc (Facilitator)  
Jakob Maase, Hopi Tribe

Craig McGinnis, ADWR  
Jessica Neuwerth, Colorado River Board of  
California  
Bill Persons, Recreational Anglers  
Rafael Reyna, EnviroSystems Management, Inc  
(Facilitator)  
Sarah Rinkevich, DOI Water and Science and  
Joint Tribal Liaison  
Peggy Roefer, Colorado River Commission of  
Nevada  
David Rogowski, AGFD  
Melissa Sevigny, KNAU  
Seth Shanahan, SNWA  
Billy Shott, NPS-GRCA  
Erik Skie, Colorado Water Conservation Board  
Michael Yeatts, Public

### Webinar Attendees

Lucas Bair, USGS-GCMRC  
Clifford Barrett, UAMPS  
David Braun, Sound Science  
Kurt Dongoske, Hopi Tribe

Paul Harms, State of New Mexico  
Ryan Mann, AGFD  
Lisa Meyer, WAPA

## Abbreviations

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

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

RPA – Reasonable and Prudent Alternative  
SA – Science Advisors  
SAEC – Science Advisors Executive Coordinator  
Secretary – Secretary of the Interior  
SCORE – State of the Colorado River Ecosystem  
SHPO – State Historic Preservation Office  
SOW – Statement of Work  
SSQs – Strategic Science Questions  
SWCA - Steven W. Carothers Associates  
TCD – Temperature Control Device  
TCP – Traditional Cultural Property  
TEK – Traditional Ecological Knowledge  
TES – Threatened and Endangered Species

TMC – Taxa of Management Concern  
TMF – Trout Management Flows  
TWG – GCDAMP Technical Work Group  
UAMPS – Utah Associated Municipal Power Systems  
UCRC – Upper Colorado River Commission  
UDWR – Utah Division of Water Resources  
USFWS – United States Fish & Wildlife Service  
USGS – United States Geological Survey  
WAPA – Western Area Power Administration  
WY – Water Year