Glen Canyon Dam Adaptive Management Work Group Meeting February 12 - 13, 2020

Wednesday, February 12, 2020

Start Time: 9:30 am MST

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

Recorder: Carliane Johnson, SeaJay Environmental, LLC

Welcome and Administrative

Presenters & Affiliation: Dr. Timothy "Tim" Petty, Assistant Secretary for Water and Science, Department of the Interior (DOI) and Secretary's Designee

Introductions and Determination of Quorum

Dr. Petty welcomed newly appointed and reappointed Glen Canyon Dam Adaptive Management Work Group (AMWG) and Technical Work Group (TWG) members. A quorum (13 required) was reached with 15 stakeholders represented by their AMWG member or alternate. Attendees introduced themselves with their affiliations and a short background.

Motion to Approve Minutes from August 2019 meeting

- No comments; no edits. Steve Wolff, State of Wyoming moved; Leslie James, Colorado River Energy Distributors Association (CREDA), seconded. The minutes from the August 21-22, 2019 meeting, as distributed on February 6, 2020, were passed by consensus.

Administrative Updates

Progress on Nominations and Appointments: Lee Traynham, Bureau of Reclamation (BOR), provided a list of AMWG nominees that had been approved as well as two TWG members. BOR will be soliciting nominees in the near future through the Federal Register. The packages to submit typically consist of a nomination letter (that must be date stamped within the Federal Register notice window), a resume, and a brief biography.

Update on Executive Order 13875: Dr. Petty remarked to the group that a 2019 Executive Order had required a review of all committees under the Federal Advisory Committee Act (FACA). The AMWG received high marks. The reviewers valued what this group produces, the people involved, and the analyses, among other things. The chair was very pleased about that. He notes there are plenty of open vacancies.

Presentation and Discussion

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

Proposed Rule for Downlisting Humpback Chub (download)

Presenter & Affiliation: Tom Chart, Jessica Gwinn, and Kevin McAbee, U.S. Fish and Wildlife Service (USFWS)

Presentation Summary

To share information about recently published 4(d) rule for the proposed downlisting of Humpback Chub.

A notification was published on January 22 that proposes to downlist humpback chub from endangered to threatened status. The Species Status Assessment (SSA), which is a compilation of information about what is known on humpback chub including the needs and current and future conditions of the species, formed the basis of the decision. A small population was lost in Yampa Canyon of Dinosaur National Monument; however, there is a strong population in the Western Grand Canyon that is expanding. Threats include changes in flow, non-native fish predations, and food supply (macro diversity). USFWS took all this information and discussed it in terms of resiliency, its representation, and its redundancy. This analysis of the population's viability has been appended to the SSA. The Upper Basin Cooperative Agreement expires in 2023, and though it is expected to continue, there is some uncertainty in that for managing flows and non-native fish. This is considered the worst-case under Scenario 1. Scenario 2 are the stressors that will be most difficult to handle, while scenario 3 is a more optimistic condition under which we can handle those threats. The conclusion to reclassify from endangered to threatened is because the fish is not at risk to extinction "now" (from 0 to 16-year timeframe) based on current conditions. When considering it under threatened status, there was the possibility of the program being diminished as well as stressors negatively affecting the species in the "foreseeable future" (16 to 40 years). The 4(d) rule will make sure that a threatened species gets the same protections as endangered. Three recovery actions were also recognized to reduce regulatory requirements: 1) translocations that can cause harm in handling; 2) non-native fish control; and 3) information and education. The comment period closes March 23. Submit electronic or hard copy comments.

Discussion/Q & A

[Chris Cantrell, Arizona Game and Fish Department (AGFD)] Was there any discussion about a distinct population segment for the Lower Basin? [*Tom Chart, USFWS] From the redundancy point of view, we abandoned that fairly quickly. It had also been considered when we did the recovery plans in the 2002 Recovery Bills.*

[Steve Wolff, State of Wyoming] Is there an assumption that the Dinosaur Monument population was extirpated because of non-natives, and has there been any discussion about reintroduction in that reach? *[Tom Chart, USFWS] It is always a mix of different factors that contribute. In the SSA, we linked it back to the construction of Flaming Gorge in the 1960s, when the Green River was cooled down and probably truncated the range of that population. It was complicated by smallmouth bass, which took off in the early 2000s, but the population had been on a downward trajectory before then dealing with channel catfish for a long time. The last humpback chub caught in that area was in 2004. The program in the Upper Basin is considering reintroducing humpback chub up there.*

[Peter Bungart, Hualapai Tribe] Do you perceive increased risk to native populations in light of the redefinition of Waters of the United States (WOTUS) under the Clean Water Act? Also, what's the ratio of species delisted compared to species that have been listed? *[Tom Chart, USFWS] We are more*

concerned for non-listed desert and Western fishes in ephemeral waters under WOTUS than we are about humpback chub. That should not affect their viability. Number of downlistings is rare. This is coordinated at the Regional level. [Leslie James, CREDA] *The USFWS has good data on its website called the "Boxscore" on total number of listed species, how many have been removed, and other information.*

Alicyn Gitlin, Sierra Club. Do you really think now is the time to delist given the need to improve species conditions under two of the three scenarios? *[Tom Chart, USFWS] When we wrote the SSA, we were constantly getting new information. When we characterized the scenarios, it was with equal probability, and the most drastic decline would have been if there was a real pull back on management actions of the Colorado River system, particularly with non-native fish control. We have made a lot more progress on the fate of the programs in the upper basin. The first scenario is diminishing in probability. We are in a better position than two years ago when the SSA was written that the fish is not at risk of extinction.*

[Arden Kucate, Pueblo of Zuni] One concern is that eventually we will consider hatchery-reared fish as native. Isn't that watering down the definition? *[Jessica Gwinn, USFWS] There was not a place in the SSA that addressed specifically the distinction of hatchery-reared versus native. It was more as to "where were the fish historically." [Tom Chart, USFWS] The idea would be to develop a "nearest neighbor" brooding stock in a hatchery that would be considered genetically similar and then try to translocate them to Dinosaur National Monument. The recovery plan would take a look at your concerns.*

2020 GCDAMP Annual Reporting Meeting Update – Part 1 (download)

Presenter & Affiliation: Scott VanderKooi, Chief, Grand Canyon Monitoring and Research Center (GCMRC)

Presentation Summary

To provide information regarding project work completed in Fiscal Year (FY) 2019 and to inform the development of the 2021-2023 triennial budget and work plan.

The presentations from the two-day Annual Report meetings will be made available on the website soon. Part 1 presentations include humpback chub, native and non-native fishes, and bug flows.

For long-term trend and spring abundance estimates of humpback chub, the current three-year average is 1,250 fish in the Little Colorado River, which is about double the trigger level from the biological opinion. For overall abundance estimates in the Little Colorado River, there is a fair amount of variability, but this also has been above the trigger. Generally, numbers look good and appear to have stabilized. There had been very few age-0 fish, which recently changed in 2019. Translocations have been going on for a number of years in the Little Colorado River above Chute Falls. These chub have higher survival rates over time, resulting in a population-level effect showing a gain 350 of fish. This is measurable and can be used to determine when action would be taken when large numbers of rainbow trout are seen. If there are higher levels of chub, then it does not make sense to do removals of rainbow trout because the conservation objectives would not be met anyway. The analysis provides a way of knowing whether the action will benefit the population.

The mainstem population has also been variable from year to year, but the three-year average is above the trigger level at 982 fish. Farther downstream is the Western Grand Canyon where few fish had been seen until around 2014. All size classes are now seen, whereas previously, it was only adults. This has

been a really interesting development. Hundreds to thousands of fish/km are being seen in the Western Canyon. This is substantial given what the numbers were even a decade ago.

Decadal temperature trends going back 25 years show warming in the Grand Canyon basin and a positive response in humpback chub. In thinking about the future under different thermal regimes (such as current conditions and a warming climate to 2 to 2.5 Celsius over the next 40-50 years), and if all reservoirs are managed the same, there would be only a little effect in the mainstem while there would be big effects in the Grand Canyon. That can have serious consequences for fish populations. There are pluses and minuses. Modest warming shows great improvements in humpback chub along with a potential boost in the aquatic food base. The biggest concern is warm water benefiting non-natives.

An overview of the second year of bug flows was also presented. These are light traps that are being collected through a citizen science effort. The hypothesis is that this daily peaking from hydropower operations creates an artificial tidal zone where aquatic insects lay their eggs in the evenings along the river margins that can die if they get dried out. The concern is that this is a reliable food supply for humpback chub. The bug flows was one approach to address this issue by improving egg laying conditions to increase insect abundance and food supply. Volunteers were used to "angle for science" in a paired study: Friday/Saturday fishing and then another group that fished on Sunday/Monday. It was found that a third more fish were caught on the weekends, which was an indication of a positive effect. Now that there is a full data set, the results are somewhat equivocal. A big response was seen in caddisfly and some bump in midges, but there is uncertainty in the data. The recommendation is to do this experiment for a third year.

Discussion/Q & A

[Leslie James, CREDA] Was the data on humpback chub translocations included in the SSA in the published proposal? Will the agencies provide new information during the comment period? It is important to get that data into the record. On the bug flow, the third prong to that is the cost. When will we have information on the costs from the last go-round? We need to factor in all this information. *[Kirk Young, USFWS] The data on humpback chub translocations weren't as quantified, but it was in the SSA. Didn't have the numbers for Little Colorado River, which were published last year. The knowledge of that data itself was probably part of the decision-making. [Scott VanderKooi, GCMRC] It was too late for that data to be included. USGS does not comment on management actions. Our role is only to provide information – we don't advocate. This is one of the challenges with these management documents. They take a lot of time. At some point, it just has to be finalized even if there is more data available. [Scott VanderKooi, GCMRC] If the bug flows are done again this year, it will be interesting for a number of reasons associated with reduced cost estimates and lower power projections.*

[Chris Cantrell, AGFD] In the abundance estimates for humpback chub in 2018-2019, there was a much larger variability in the sample while the numbers from 2013-2015 looked pretty tight. Can you explain that? Any changes in sampling protocols those years? *[Scott VanderKooi, GCMRC] Believes this was just up and down variability. A lot has to do with the fish being cooperative. When the capture probability goes down, the uncertainty estimates go up. There were no changes in methodology.*

Stakeholders' Perspective—Colorado River Board of California (download)

Presenter & Affiliation: Jessica Neuwerth, Environmental Scientist, Colorado River Board of California (CRBC)

Presentation Summary

Provide an introduction to the Colorado River Board of California, outlining the organization's values, priorities, and major activities related to the Colorado River and the Glen Canyon Dam Adaptive Management Program

The Colorado River Board of California was established in 1937 to serve as the unified voice for water users representing six major water agencies (three urban and three agricultural). California has mainstream apportionment of 4.4 million acre-feet. How water is used and distributed varies by year and the type of user (quantified and unquantified). As early as 1950, California was already using its full mainstream apportionment. In 2003, the state put in place the largest urban water agreement, called the Quantification Settlement Agreement (QSA). In 2019, the state was at its lowest level of usage since 1950 due to a combination of transfers and other activities to lower water use. It is a complex system to move water where it is most needed. This includes finding new sources such as with the Carlsbad Desalination Plant and new investments in recycled water that will soon result in the availability of tens of thousands of acre feet. The Salton Sea is also right in the middle of the two biggest agricultural agencies. It used to rely on agricultural discharges, which have been declining and is causing ecological and public health concerns. We want to make sure that does not become a stumbling block. The state is interested in keeping aware of how and when water is moving from one basin to another.

Discussion/Q & A

[Jan Balsom, National Park Service (NPS) – Grand Canyon National Park (GRCA)] What can you recover from the desalination plant and how does that add to what you can use? What are the environmental concerns? *[Jessica Neuwerth, CRBC] That's a $1 million investment with 60,000 acre-feet of offset. From environmental compliance, the Lower Colorado River Multispecies Conservation Program is mostly for on-river effects (damming and diversions). That's when there is the most flexibility. There is an obligation to stock 1.2 million native fish and to create/maintain 8,000 acres of habitat. It took about 10 years to put together to mitigate both federal and state effects.*

[Richard Powskey, Hualapai Tribe] Is water from the Colorado River being used to recharge groundwater in Southern California? *[Jessica Neuwerth, CRBC] Yes, there's been about 4 million-acre feet of water recharged in the Coachella Water District, which backfills groundwater used because many farms were already established on groundwater.*

[Peter Bungart, Hualapai Tribe] There is a lot of groundwater pumping. How much of that recharge offsets that? *[Jessica Neuwerth, CRBC] It varies and depends on the area, but they have actually raised ground water levels about 15 to 20 feet.*

Overview of the Upper Colorado River Endangered Fish Recovery Program (download)

Presenter & Affiliation: Tom Chart, Director, Upper Colorado River Endangered Fish Recovery Program and Jessica Gwinn, Biologist, U.S. Fish and Wildlife Service

Presentation Summary

To share information about the purpose, achievements, current workplan, and future of a complementary program in the Upper Colorado River Basin

This presentation is about both the Upper Colorado River Endangered Fish Recovery Program, which was established in 1988, and the San Juan program, established in 1992, which is dealing with other

species in the Colorado River system. The Upper Colorado River program is tasked with all listed fish (Colorado pikeminnow, razorback sucker, humpback chub, and bonytail chub). There are two goals. The first is to assist in the recovery of the four listed species that are only found in the Colorado River System. The second is to allow water development to continue.

For the recovery actions, these are comparable between the two programs that involve habitat development, flow management, non-native fish control, and fish stocking. There is also a strong commitment to research and monitoring, as well as information and education and program management. Non-native fish management is probably the biggest threat. The focus is on three species (smallmouth bass, Northern pike and walleye). One of the places that was an epicenter of smallmouth bass is in Little Yampa River Canyon with population estimates of 3,000 adult fish within a 24-mile stretch that is now at 300 fish. This has been an adaptive process that has to align the fish with the hydrology. The Colorado pikeminnow has been stocked for 12 years now. We now have native young-of-the-year in San Juan River system. Colorado pikeminnow plan is also currently under review. We probably won't change its listing. Razorback suckers need to complete their life cycles. This monitoring information feeds the SSA. The hope is to publish their revised plan in 2020 for downlisting. Both programs sunset in 2023. We need to figure out a future of these recovery programs and future funding strategies.

Discussion/Q & A

[Steve Wolff, State of Wyoming] Not a question, but an acknowledgement to Tom and his staff on the San Juan program, which is critical to the states.

[Leslie James, CREDA]. Can you talk more about non-native fish management, such as who does what, where does the money come from, and what actions are being taken? There's been a distinct shift. What are the states asking the public to do? *[Tom Chart, USFWS] We focus on the non-native fish just before they spawn. We are electrofishing more than 600 miles of river and installing screens on spillways to try to contain those fish. We all recognize this is the biggest nut to crack. We communicate with others across the nation to determine the best approach (genetic technology, research to employ) for the sustainability of non-native management efforts. The states of Colorado and Utah have changed their fishing regulations to "must remove" or liberalize the catch limits. Colorado and the Colorado River Conservation District are also doing tournaments to remove these fish. This is incentivizing their removal.*

[Richard Begay, Navajo Nation] Are you working with any of the Indian tribes? *[Tom Chart, USFWS] The San Juan program has the four Native American tribes. There is constant communication with them on in-river channel catfish control programs.*

[Jan Balsom, NPS-GRCA] What can we do to develop targeted flow regimes and how do you come together on those recommendations? *[Tom Chart, USFWS] We have the luxury in Green River of an unregulated tributary that provides natural spring flows. We try to work with BOR to capitalize on that and use those tributaries as a signal for when razorback suckers are spawning, then waiting for the larvae to show up to build the peak at the right time. This is an adaptive process. We don't have as large a river as we used to, but we can still mimic the hydrographic flows.*

[Steve Wolff, State of Wyoming] Can you discuss the Flaming Gorge hydrology scenarios? [*Tom Chart, USFWS] This refers to the importance of low flow, spring flows and that intra-annual variability.*

2020 GCDAMP Annual Reporting Meeting Update – Part 2a (download)

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

Presentation Summary

To provide information regarding project work completed in FY19 and to inform the development of the 2021-2023 triennial budget and work plan.

Part 2a of the presentation covers: 1) nutrients and temperature as ecosystem drivers and Lake Powell, 2) riparian vegetation, 3) warm-water invasive fishes, and 4) trout.

The nutrient and temperature study focused on primary producers. The method to measure this productivity is by dissolved oxygen in water as a surrogate. The data shows that even when it is broken out by season, there is a good relationship between this GPP (gross primary productivity as measured by dissolved oxygen) and aquatic insect populations. The controls on GTP are sunlight, temperature, turbidity, and nutrients (primarily nitrogen, carbon dioxide and phosphorus – the most important for plants). Soluble phosphorus is believed to be the limiting factor in primary production in the Colorado River. When the soluble reactive phosphorus (SRP) is measured, there is a reasonably good relationship, but it's not the most important. Although SRP is important there are other things coming into play such as turbidity, discharge and position in the canyon. We need to do more work on these other variables. Phosphorous gets into the river from loading into Lake Powell and coming out through the dam. This explains 55% of the variability in SRP, but there is a cycling that we don't fully understand.

Regarding vegetation monitoring, this data comes from 43 different sources (sand bars) and other 140 sites (such as flood plain deposits) that are measured multiple times per year. Native cover has increased from 2014 to 2019. Aerial photos were also used to measure and map vegetation. The overflight data is used to produce many different products including multispectral imagery for vegetative species maps, digital topography to establish flowlines, and land cover classifications. It is hoped to continue this in the next workplan because the products are useful. Would like to know how other stakeholders have been using these products.

The studies on hydrologic variables are looking at response to flow conditions in which niche models are being developed. One product that will be available soon is the percent of sand that is suitable for colonization of various kinds of plants (both natives and non-natives).

Discussion/Q & A

[Jakob Maase, Hopi Tribe] Is anyone looking at Russian olive along the Grand Canyon? *[Mike Moran, GCMRC] Don't know the specifics on that.*

[Jan Balsom, NPS-GRCA] Anyone who has spent time in the canyon knows that sand turns into vegetation. The bigger issue is how to better manage vegetation encroachment? [*Mike Moran, USFWS] Been working with the NPS on vegetation removals. These are very effective right after they are done. For some species, like arrowweed, if they are removed repeatedly, they will stop coming back.*

[Leslie James, CREDA] Is plants colonizing on bare sand a good thing or not? It may not be a good thing with non-natives. Does it depend on who is looking at it and then what do we do about it? *[Scott VanderKooi, GCMRC] The value is to understand what might show up and where. How you treat one species is probably different than another. If you have a predictive understanding of where they show up*

that can help managers on their strategies. In general, we do not want invasives. It's a very good question and difficult to answer. What do others value?

[Rob Billerbeck, NPS] Maybe some of the specificity was lost in that presentation because GCMRC is doing very good studies such as on genetics that are directly applicable to management. We're also getting specific site information on removals. They are doing a lot to relate that imagery to specific site recommendations per species.

[Kelly Burke, Grand Canyon Wildlands Council (GCWC)] There is also some learning to look at the whole suite of plants when tamarisk is removed such as with tree willow. There is an interrelationship between these species and the whole process of restoration and rehabilitation.

[David Brown, Grand Canyon River Guides (GCRG)] Historically, these beaches didn't have vegetation. This is a post-dam condition. The overflights are important and it would be a tragedy to not do them next year. *[Scott VanderKooi, GCMRC] Having this change condition is very important.*

[Peter Bungart, Hualapai Tribe] Vegetation also interferes with an HFE. This is another aspect of vegetation encroachment.

2020 GCDAMP Annual Reporting Meeting Update – Part 2b (download)

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

Presentation Summary

To provide information regarding project work completed in FY19 and to inform the development of the 2021-2023 triennial budget and work plan.

Green sunfish and channel catfish are both predators that can wreak havoc on native species. Catch rates from electrofishing of rainbow and brown trout along Lees Ferry to Glen Canyon (about 16 miles) show a cyclical pattern with varying peaks and troughs. The pattern is really driven by young fish. Starting to see recovery in catch rates for the boat and walk-in fishery. From 2012-2013, there were a lot of fish in the system, but it was driven by the equalization flows of 2011 and was unsustainable. By 2014, we had a sharp decline in trout abundance in Glen Canyon and throughout the system. Then moved into a low level of stability. Overall abundance was low to stable. Saw improvements in 2018-2019. It is a fairly robust population now and seeing larger class sizes.

The importance of phosphorus in the system is driving these populations and is the best predictor of rainbow trout in the Glen Canyon versus other complex flow models. In thinking about predictions and the use of science in our programs, the primary motivation of applied science is to predict how change occurs if we do nothing versus if we take actions. What that means is that we should not worry about precision; we need to worry about the trend of the populations. For brown trout, we have catch statistics, but you have to be careful with that data because catch probability changes. By using mark/recapture methods, we can understand the trends, and that's what we really should be doing. Also finding that brown trout seem to be able to get food better than rainbow trout (either they have better access to food or better feeding success). We need to pay attention to this because these fish are behaving differently even though both are trout. We are now focused on sampling rainbow trout abundance. Last couple years, there is some evidence of migration and recruitment, probably from the Marble Canyon reach.

Discussion/Q & A

[Jan Balsom, NPS-GRCA] Should we be comforted or terrified about these numbers of sunfish, catfish and brown trout? All the numbers are problematic to the natives. At the same time, there's all this dispersal from flood events. We have a hard time connecting all the pieces into a system approach. Can you connect those dots? [Scott VanderKooi, GCMRC] You could think about this in terms of risk such as in the Little Colorado River where humpback chub have done pretty well in spite of the conditions. It is something to pay attention to. We haven't really monitored catfish so don't have a sense of what's there. They have probably been pushed down there from the floods, but the chub have persisted, which is an encouraging sign. The other encouraging sign is the lack on non-natives in the mainstem, particularly in the Western Canyon. That has changed over the past 20 years and is one of the most interesting stories because we have gone from mostly non-natives to mostly natives. There are some things that are going right. We still need to think about risk of brown trout. They have been in the system for a while, but we are starting to see some responses that we had not seen before. We responded quickly to green sunfish, which speaks to the effectiveness of this program to identify risks when we see them. It is more encouraging than terrifying.

Tribal Liaison Report

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

Presentation Summary

To report on the Tribal Liaison's activities and meetings as well as Tribal concerns, challenges, and accomplishments.

(No visual presentation.) This Tribal Report relays a number of issues of concern regarding work and resources that are part of the AMWG program. Four of the issues are: 1) overall tribal participation in the adaptive program and their perspectives, 2) proposed downlisiting of humpback chub, 3) the workplan and budget including projects proposed by the tribes, and 4) knowledge assessment. Tribal representatives have said we need to get to a larger conversation to better understand the underlying issues that tribal stakeholders have about this program. There has been continued frustration by several tribal stakeholders on the lack of understanding of the relational aspects of how one affects the other. The program's approach of Western Science oftentimes excludes that tribal voice. It affects the "data" that we have available to this program. As to humpback chub, there are concerns about what the downlisiting means to the species. Is the amount of knowledge that we have enough to make this decision? Discussions about the triannual workplan and budget also continue with a number of calls planned. She is pleased that the response from colleagues is proactive and the tribes have been engaged as early as possible. There has been much discussion regarding knowledge assessment. Part of that goes back to trying to answer to the idea that knowledge assessment could become a tool between what we know and don't know. This seemingly straightforward assessment oversimplifies how the tribes view those resources. There are five tribal communities each with their own unique sociocultural ways. We acknowledge that the data being sought requires an investment of time and funds and many people to commit to this long-term work. Lastly, if the body as a whole has to go before a tribal council, it is not out of the realm for them to ask, "What is the benefit to the tribes and tribal communities?" We might need to change that perspective to help accomplish this work.

Discussion/Q & A

[Kurt Dongoske, Hopi Tribe] Only thing to add would be about the knowledge assessment. If tribal perspectives are presented, will they be treated equally? Will the science override tribal perspectives?

[Jan Balsom, NPS-GRCA] We have asked our tribal colleagues to provide a lot to this program, but then the question is what goes back to those communities. I don't know if we have come up with that information such as school programs or reports or the science that the tribes can use in their own management. Has that come up? *[Theresa Pasqual, Tribal Liaison] Ideas have been discussed. This came up during the river trip on their needs. There was real thought processing from non-tribal members who said they were going to think about this including the academic and economic needs. We've talked about how to share published work outside of this program. The biggest challenge is that we are part of a world in which systems, processes, laws, and programs have been overlaid on the tribes. Knowing that they exist within this "system" much like the resources we are analyzing (fish, plants, sediments), tribal people are part of that system, but it never gets talked about from that perspective. What you see as a need is a result of us living in that system. That is the fundamental challenge. We are trying to get to that core, but it requires knowing how tribal communities fit into that system and how we are supposed to respond to that system. The deadlines on the horizon do not encourage deep conversations.*

[Charley Bulletts, Southern Paiute Consortium] An old colleague referred to it as natives and non-natives in the Grand Canyon ecosystem. We are putting ourselves into the natives category of fish, plant and bug. It is sometimes hard to answer something to a non-native who knows it all and has the money to study it all. This is an inside joke when we hear about non-natives talking about the system. He commends Theresa on her work and that words speak louder than pictures.

[Richard Powskey, Hualapai Tribe] A quick story about the 100-year anniversary of Grand Canyon National Park. A grassroots group wanted one of the tribes to participate, but many of the tribes didn't want to be involved because it was a hundred years of exclusion. It took a while to be able to get that stuff vetted out. We did come to a place where we got our foot in the door to make a difference over the next 100 years, but there is a lot of history and its interpretation that does not include the native component. It is not talked about too much. When the Park Service did the logo for the 100-year anniversary, we asked if they would put a handprint to at least show a small piece of our involvement. They didn't do it. It is an analogy that our presence isn't really identified. It's important to be upfront about it. We might lack scientists, but we do have researchers. It is important to get a good perspective about these studies, but that data is more important to the tribes for what we are trying to push for such as lands or water rights. How is it going to benefit us and be tailored to our needs? That is the bigger picture. Then there are the politics involved with respect to funding. This is some of the information that needs to be recognized. That is what we are looking at from a tribe as to how this program might benefit us. *[Dr. Petty, AMWG Chair] It is a fair question and good to hear your perspectives.*

Annual and Extraordinary Maintenance at Glen Canyon Dam (download)

Presenter & Affiliation: Robert "Bob" Martin, Facility Manager, Glen Canyon Dam, Bureau of Reclamation

Presentation Summary

Provide AMWG members with information and improve understanding of maintenance schedule at Glen Canyon Dam.

Glen Canyon Dam was put into service in 1965 with eight generating units at 1,320 MW at full pool. Life cycle maintenance is very important. Replacement is generally on a 25-year cycle with the windings and 45 years for the turbines and transformers. Equipment is not removed when it hits that age; there is an assessment program that rates each piece of the equipment. We look five years out from the expected replacement date. There is an outage schedule that considers the budget, the engineering requirements, the time to acquire the new piece, and then the time to get the equipment back in service. Future large capital replacements will include the switching gears and transformers in 2021.

Discussion/Q & A

[John Jordan, Fly Fishers International (FFI)/Trout Unlimited] He had heard that a substantial drop would occur in the flow of the river during an upcoming maintenance activity. What would be the period of time and would that be a steady flow? That would have a substantial impact on recreational fishing. *[Bob Martin, Glen Canyon Dam] There is a recommendation to remove a broken piece of tailrace slab, which we are looking to do in March 2021 so we would need the flows to get down to 4,000 cubic feet per second (CFS). [Heather Patno, BOR] Yes, it would be a steady flow of 4,000 CFS during the day and a different flow during the night for 4 to 5 days. [Scott VanderKooi, GCMRC] We thought about the research opportunity when we first became aware of it in late fall. It almost completely derailed us from writing the annual report. There was a lot of excitement about the potential for learning about all the resources. We are pleased that it has been put off so we have time to plan for it. It is a great opportunity because flows like that have not been seen in a very long time.*

[Jan Balsom, NPS-GRCA] It is important to recognize all the different parts and pieces. We have been thinking a lot about the 4,000 CFS flow from the management side. We also recognize all the different things in the maintenance and schedule, and how to do that with the least amount of disruption.

[David Brown, GCRG] If it is 1,300 MW at full pool, what is it actually now? What is getting taken out? What is the output? Think there was discussion about putting this facility into renewable generation, but a single wind turbine only generates 1-3 MW each. *[Bob Martin, Glen Canyon Dam] It is closer to 1,000 MW now. That is the capacity. What is getting taken out depends on the demands. The Western Area Power Administration (WAPA) directs how much to release. That constantly changes. [Heather Patno, BOR] We should have numbers in capacity in both acre feet and CFS, but the MW numbers we get from WAPA. For February, it was around 300 MW, but it depends on the month and capacity. Will need to look at that again to know for sure. [Steve Johnson, WAPA] I'd have to work on getting those exact numbers. It depends on the monthly volumes. We try to match our customers' needs to the extent possible within the guidelines. Generally, it is 300 to 600 MW across the year. The main thing to understand is the loss of efficiency. That is very important. The same amount of water makes a lot fewer megawatt hours. This is an important concept. We are not extracting as much energy from that lake because of the loss of head. If we ever get into full runoff in Glen Canyon, it is wide open. Would love to see that again at a 60,000 CFS HFE. [Leslie James, CREDA] Think there is a pictogram that compares output between wind farms and turbines. Believe the loss is about a third of capacity.*

[Ed Gerak, CREDA] With the reduced flow, I'd like to look at excavating the downstream lump that's causing a head differential. *[Bob Martin, Glen Canyon Dam] We had a study done on the lump and it's*

about a 1-3-inch difference. We would need to get to the technical service center in Denver to see if there is any appreciable loss of head.

Basin Hydrology and Operations (download)

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

Presentation Summary

To increase understanding of water supply, forecasted hydrologic conditions, and projected reservoir conditions and operations for the current and upcoming water year.

For 2020 snowpack at Lake Powell, we are right about where we were last year. We don't know what is coming because January 1st only tells us what has occurred, which is about 40%. It isn't until about April when we have about 90% of the total amount. We have not seen the inflows for the snowpack to get us into an equalization tier. Moving forward to 2021, with 9 million acre-feet (for both minimum and maximum), it is showing shortage conditions. With equalization level, the range is higher. There is a significant amount of uncertainty with this forecast in 2021, which is very far into the future. We are trying to determine if we have enough capacity to move the equalization volume within the maintenance schedule. We will need to discuss the shift in regulations and reserves.

There are differences in temperature from Lake Powell releases that cause the downstream to get warmer in the summer before converging again in the winter. This is normal, but it changes during dry years. During periods with significant spring inflows (a rise of 50 feet), we see a decrease in dissolved oxygen at the penstock. We know the conditions that cause this. It is of short-term duration (June to mid-November). If we see the conditions occur again, we will begin discussions on what will happen.

Discussion/Q & A

[Scott VanderKooi, GCMRC] Can someone explain the equalization pattern and how high will it go? *[Heather Patno, BOR] There is a lot to that question. Simply, the level was taken from 602(a) Storage and put into the interim guidelines. That is why it increases. [Steve Wolff, State of Wyoming] Yes, as time goes by, those demands go up by demands and we will use the storage in Lake Powell by three feet every two years.*

[Jan Balsom, NPS-GRCA] In terms of the reservoir levels, you are controlling the amount of storage in Lake Powell by the reservoirs up above it. Is that right? What you can control is based on the reservoirs from above and their own environmental documents. If you were full at the upper end, would you release? How do you balance all these environmental commitments and power needs in a multi-tier system that starts at different reservoirs? *[Heather Patno, BOR] Each reservoir upstream has their own RODs that drive their ESA operations. As that water comes down it includes tributary flows that we don't have any control over. As the inflows increase, then you see differences in the elevations. That is why we have the 24-month study because each has its own flows with their own RODs. Then we see what is happening at Lake Powell. Part of that planning includes WAPA.*

[**Peter Bungart, Hualapai Tribe] Saw an article that said even though we had a good snowpack, because of the dry conditions, the soil is going to soak up a lot of the water before it ever reaches the reservoir. What is your assessment of that?** [*Heather Patno, BOR] That's correct. While we had a good last year, the conditions dried up and that's what is frozen in the system. The soils are going to soak up that water.*

First Day Meeting Adjourned at 5:00 pm

Thursday, February 13, 2020

Start Time: 8:30 am MST

Administrative Updates (continued from Day 1)

Tim Petty, AMWG Chair, especially new members, make sure you give Lee comments on the packages.

Action Item Tracking Report (presented on Day 2): First item is planning for future years by developing monitoring metrics and streamlining the Glen Canyon Dam Adaptive Management Program (GCDAMP) guiding documents. As a start, we have the metrics used in the Long-term Experimental and Management Plan (LTEMP) environmental impact statement (EIS) decision analysis as well as the knowledge assessment. As we develop the 2021-2023 workplan, BOR and GCMRC will be looking at where we have consensus on existing metrics and will flag areas where we need to spend time and effort to determine the best approach to track the status of certain resources. We also need to ensure a science advisor is in place to assist in that effort.

Second item is the temperature control paper, which is available. There is currently no silver bullet. The most recent biological opinion is looking at how we can get both warmer and cooler temperature releases. That is a very broad challenge. Believe this action item is complete.

Third item is Tribal support. DOI provides funds to support tribal participation. Historical records were provided as well as input from tribal representatives. Believe this action item is complete, but still need to hold space for conversations with tribal representatives.

Fourth item is the TWG take up of the High-Flow Experiment (HFE) Assessment action item. The TWG chair recently established the Flow Ad Hoc Group that will be chaired by Peggy Roefer, Colorado River Commission of Nevada. Their report will be reported to the AMWG in May 2020. This action item will remain open pending that deliverable.

GCDAMP Funding Update: Lee Traynham, BOR, as to the budget for FY20, the program was fully funded at the same levels as last year. There is uncertainty in future funding. There was an issue with FY19 funds, but after stakeholders expressed their concerns, Congress returned the funds to make the group whole. That put us in a bit of a limbo in FY20 with a continuing resolution in which we were not included of “prior funding” because of this special appropriation and did not have funding for part of the year. We are in good shape for 2020. It is uncertain for 2021 and beyond.

Stakeholder Updates:

To share updates regarding current stakeholder activities on the Colorado River that are pertinent to the GCDAMP.

Jan Balsom, NPS-GRCA, shared a video with respect to how the Park Service addresses concerns of the tribes. We at Grand Canyon have been trying to come up with a new strategy for the next 100 years. We can’t erase the past. The video is an example of how we are working on this future with a number of partners. Over the last three years, the park is turning its East Entrance into a cultural site. All tribes are participating. This is to change the narrative and allow our tribal communities to be more visible and active. It is time to change the dialogue and take the next step. This is a generational shift and where we are hoping to go with our tribal partners.

Chris Cantrell, AGFD, there has been uptick on boater and walk-ins. The fishery is still in recovery and have not met catch rate goals. No plans for stocking this year because of the recovery. We know the stocking does work. Also had a Tag Study with interesting findings that shows our assumptions were accurate. There was a maximum of 17% downstream movement of three miles but some moved back up four miles. Pretty close to what we expected.

John Jordan, FFI/Trout Unlimited, nothing to report except to say that these updates are a really nice idea as part of our meetings.

Jessica Neuwerth, Colorado River Board of California, no updates. Just watching snowpack.

Peggy Roefer, Colorado River Commission of Nevada, with respect to the Flow Ad Hoc Group, reminds everyone about the hydrograph objectives, please flesh out the outline.

Arden Kucate, Pueblo of Zuni, looking forward to build capacity and to include tribal interests in the discussions.

John McClow, Colorado Water Conservation Board (CWCB), no specific update. The Colorado Water Conservation Board is hard at work and studying the feasibility of demand energy.

Kevin Garlick, UMPA, nothing from the power users. Simply looking forward to understanding the HFE studies and how that affects power production.

Steve Wolff, State of Wyoming, nothing to report

Leslie James, CREDA, she brought a treasured artifact from the 1999 AMWG river trip when the vision and mission were created.

Kirk Young, USFWS, there are opportunities to comment. Humpback chub comments are due on March 26. Also comments on the Kanab ambersnail delisting proposal are due on March 6. Razorback will occur sometime after that. We have a USGS expert panel looking at habitat feasibility for the Colorado pikeminnow to see if there are conservation opportunities. Will share that with the group in May.

Chip Lewis, BIA, nothing to report now, but our regional archeologist has been able to get funding for tribal youth programs and recent spring restoration work with Hopi youth. He was in DC this week accepting an award with our tribal youth. Hualapai wants to get into that, too.

Peter Bungart, Hualapai Tribe, gratified that AMWG appointment was approved, but notes that most tribal positions are still pending. If there is any way to expedite those, especially in light of being able to vote on the Triennial Work Plan, that would be great.

Jakob Maase, Hopi Tribe, the next river trip is scheduled for May.

Jan Balsom, NPS-GRCA, (Rob Billerbeck, NPS) non-native fish environmental assessment (EA) and FONSI in early fall. Based on concern with brown trout, the latest science is still unclear why we are seeing increases there and are concerned about predation on humpback chub. The EA is to try something new that was suggested by the tribes to incentivize harvest and reward the anglers to remove and consume the non-natives. Also want to provide opportunities for tribal youth to spend some time in the canyon. Regarding the budget, now that we got the FONSI signed, we have applied for every way to apply for a budget. There is a time lag between applying and getting the money. Brown trout is a shared concern.

(*Ken Hyde, NPS-GLCA) The tribal youth program will start this fall. No discretionary money. Have $50,000 to kick off the incentivize harvest that should start this fall. The park has committed to also provide any contingency funding. We don't want to stop it if we run out of money. In 2022, this is the first year we can get DC funds. Also looking at other opportunities to fund this. In the past, there had been some funding for brown trout that is routed through another mechanism that goes to Grand Canyon. Still looking at that. AGFD is looking at National Fish and Wildlife Foundation (NFWF) grants that we can't apply. Also looking at a line item in the budget, but that is a 2 to 3-year process. Because this is new, we are working closely with GCMRC to link together, track it, measure it, to make sure it is effective. Working with AGFD on the design and BOR to make sure we are approaching it the right way on information they will need. Hydropower also suggested pursuing the NFWF grant.*

Larry Stevens, Grand Canyon Wildlands Council, has received funding to restore a tamarisk site that will transform a very degraded habitat into native vegetation stand. About fishing, lures are great, but won't catch as much as with bait. Also, blue gills are quite good to eat and kids like to catch these.

David Brown, GCRG, looking into an alternate for AMWG. Keeping up with all the downlistings. There are also various pump storage proposals around Little Colorado. They seem speculative, but still need to be treated seriously. Preparing for our guides training seminar at end of March. It's very educational for both on land and on the water. Any stakeholders interested should consider it.

Scott VanderKooi, GCMRC, there are new fact sheets available that were developed last fall regarding interactions between rainbow trout and humpback chub. These are summaries of the studies. Another fact sheet is on the management of sand in the canyon with the objective of protecting cultural resources.

Brent Esplin, BOR, this year is the review of the interim guidelines. The review will be kicked off in March and April. There will be a basin-wide webinar. Hope to complete the review by mid-December. The guidelines are a look back, while next year will start the re-negotiation of those expiring guidelines.

Long-Term Funding Considerations – Hydropower Revenues vs. Appropriations (download Part 1) (download Part 2)

Presenter & Affiliation: Brian Sadler, WAPA and Kathleen "Kathy" Callister, BOR

Presentation Summary

To provide information regarding long-term funding uncertainties and important considerations for various potential funding sources.

[Brian Sadler, WAPA] BOR owns and operates the dam. As the power leaves, WAPA takes over to market and deliver it while revenues go to operations and associated projects. Rates are cost-based – what is brought in, covers costs, which include BOR expenses and cash to fund replacements. Some risks to cash flow include: 1) the replacements program including unexpected replacements, 2) environmental programs –this is a risk because it is a fixed amount no matter whether revenues drop or expenses increase, and 3) purchase power. Lake elevations dropped significantly in 2018, then went up in 2019, but they are not at the levels they were in 2017. In 2019, the overall purchase power is $16.4 million; it will be $10.7 million for 2020. Reason is because lake elevations are much higher, allowing WAPA to generate electricity much more effectively. Environmental funding is $21.4 million, which will be provided to BOR. The big issue is to find a solution for FY23 and beyond.

[Kathy Callister, BOR] An authorization is an act by Congress to permit a program or to fund a program, but it does not actually grant the funding. An appropriation is needed for that. This allows the federal agency to make payments from the Treasury. Funded by two laws: the Grand Canyon Protection Act as well as an act in Veterans Affairs and HUD that allowed funding for the GCDAMP. Then we move to appropriations. In FY 2020, Public Law 11694 gave us those funds and identified where they were coming from. The process begins at the Office of Management and Budget to provide guidance to the agencies. Then the president releases his budget and Congress comes up with an appropriations bill that becomes law when the president signs it.

In February, the president released a budget for FY22. The agency will start its FY23 budget process this October. The president's current budget includes $21.4 million for Colorado River activities. Funding is based on a three-year process. All the money needs to be obligated in the fiscal year.

Discussion/Q & A

[Steve Wolff, State of Wyoming] Is the $21.4 million in the current budget hydropower dollars or will it be appropriated? *[Brent Esplin, BOR] Both ways were requested. One of them will be funded.*

[Larry Stevens, Grand Canyons Wildlands Council] Was there rollover money last year that will be factored into this year and can a risk assessment be made over next three years of planning? *[Scott VanderKooi, GCMRC] We got an agreement to move those funds from FY19 into FY20. Part of the challenge was the ending of the five-year agreement with USGS that needed to be put into place again.*

[John Jordan, FFI/Trout Unlimited] Once you have this money, is that allocated between the lower basin and the upper basin? Is there much discretionary spending? If the funding is reduced, is the reduction split equitably among the programs? *[Kathy Callister, BOR] There is $1.4 million allocated to consumptive uses and water quality. The $20 million is divided based on historic numbers. The program splits are based on each of the budget workplans. We haven't had to deal with a reduction, but it probably would be equitable.*

[Steve Wolff, State of Wyoming] With the reduced funding scenario, when are we going to hit a bottom point? *[Brian Sadler, WAPA] Our goal is to find a solution for FY23 and beyond. [Brent Esplin, BOR] We need to find certainty on funding this program in the future. What does a sustainable funding model look like? Hope to roll that out soon. We need to fill the gap. Maybe this means more federal cost share with the states. How do we build this support? We need to have those discussions.*

[Leslie James, CREDA] Brian and Brent said they are looking at FY23 and beyond for a solution, but the FY23 budget is coming up this October. Also, the president's budget on Monday included language to divest WAPA assets. That's a challenge and takes a lot of non-federal parties to push back on those kinds of proposals. *[Brent Esplin, BOR] Part of this is an educational issue, such as transferring Department of Energy (DOE) funds to DOI. New people in Congress need to be educated on the issues.*

Long-Term Experimental and Management Plan (LTEMP) Litigation Update

Presenter & Affiliation: M. Rodney "Rod" Smith, DOI Solicitor's office

Last fall, three groups sued the department on NEPA grounds on the December 2016 ROD. These were Save the Colorado River, Living Rivers, and the Center for Biological Diversity. The complaint is that we should have done more to consider climate change, and to include that process in the purpose and need statement. They expressly noted decommissioning and operational scenarios. The Administrative

Record will be filed on April 3 and briefs will probably be filed in late summer or early fall. Several states are also exploring becoming intervenors. Let Rod know if your organizations have any interest in this.

Discussion/Q & A

[John McClow, CWCB] What are the opportunities for financial benefit to the plaintiffs? *[Rod Smith, DOI] Not going to address that specifically except to say, in general, at least one of the plaintiffs seems driven to oppose water projects in general.*

2020 GCDAMP Annual Reporting Meeting Update – Part 3 (download)

Presenter & Affiliation: Michael Moran, Deputy Chief, Grand Canyon Monitoring and Research Center

Presentation Summary

To provide information regarding project work completed in FY19 and to inform the development of the 2021-2023 triennial budget and workplan.

This presentation is on the science updates related to sediment, archaeological, socioeconomic and hydropower.

Last fall with no HFE, the suspended sediment monitoring showed one big spike in late July and then that was it. The cumulative sand load was only about 6,000 metric tons (MT). That was not enough to conduct an HFE. In terms of long-term sediment management on the Paria River and Little Colorado River, even during periods of good inputs, we have intervals in between when there is winnowing and erosion, which create setbacks. Multi-sand accumulation is really only possible during above average tributary sand supply and below average dam releases when you get a lot of erosion. Campsite Area Monitoring shows areas decreasing, but since about 2012, this decrease might be leveling off mainly due to vegetation expansion. A number of areas have been mapped using single and multi-beam sonar. The conclusions suggest that most sand bars seem to be increasing over time (although small) and that controlled floods seem to be an effective condition for sandbar growth.

Wind transport of sediment can help preserve some of the archeological sites. Experimental vegetation removal on sandbars was begun in 2019 to help offer protection. GCMRC is monitoring these actions by conducting surveys before and after treatment.

Regarding socioeconomic research, one thing that is being looked at are tribal perspectives to recognize Navajo values and to prioritize management goals. This is a completed survey of the Navajo Nation that shows the majority of respondents do value and support implementation of flow experiments to improve downstream resources. There is a willingness to pay a value of $1.44 per day for that work.

The LTEMP goal for hydropower research is to increase Glen Canyon Dam electric generation and minimize costs. One result is that the business-as-usual scenario has more negative operational costs, but they are offset by lower emissions, suggesting that this is the best way to go.

Discussion/Q & A

[Larry Stevens, Grand Canyon Wildlands Council] Is sand accumulating on the channel bed in the Upper Marble Canyon? The data you have stop in 2012 or 2014 for the lower part of Marble Canyon. Can the sand stored on the floor of the river in Upper Marble Canyon be understood to be a resource to restore sand bars following a springtime HFE? *[Mike Moran, GCMRC] Yes, that is probably the best place to look for it. The results from Project A should tell us that.*

[Leslie James, CREDA] You have to be careful about how to describe "business-as-usual" because the non-business-as-usual case does not reflect current restrictions. It would be nice to have no restrictions so the resource can be used by the customers, but the reality is that we have restrictions. She cautions the assumption that business-as-usual will result in more costs. *[Mike Moran, GCMRC] Maybe we haven't looked at it that way. Will pass your comment along.*

[Jan Balsom, NPS-GRCA] Sandbars are starting to stabilize, we have vegetation encroachment, which we knew would need to be removed. The modeling efforts are lining up with what we are observing. This is confirming the model assumptions. *[Mike Moran, GCMRC] The presentations should be posted soon so that all the studies can be looked at. [Rob Billerbeck, NPS] When we did the LTEMP modeling, it was wildly exciting to see that we had stopped the decrease in the beaches. That is huge. The camping beaches are static, but that is much better than decreasing. Modeling did predict the future.*

[Scott VanderKooi, GCMRC] We are continuing to learn from those models. These rich data streams are allowing the science to move forward. Some of the challenges of reduced sand is going to be a test in terms of management actions.

[David Brown, GCRG] There are differences in Marble Canyon and Grand Canyon camping. They are not equivalent. Maybe it is not the stabilization you are looking for.

Technical Work Group Chair Report (download)

Presenter & Affiliation: Seth Shanahan, Technical Work Group (TWG) Chair

Presentation Summary

To update AMWG members on the TWG meetings held October 2019 and January 2020, including the results of the 2019-2020 Knowledge Assessment.

The Flow Ad Hoc group (FLAHG) has been finalized. The group started to define their first objectives and will develop potential hydrographs to meet those objectives. TWG is also thinking about such things as the LTEMP lawsuit, the pumpback hydro project, and potential ideas of stocking razorback suckers in Grand Canyon and bonytail chub in Lake Mead. There has been interest in learning more about how a spring HFE will be triggered. Another topic stemmed from the fall 2019 releases of high temperature and low dissolved oxygen. There was a lot of concern over a three-day period this could be a problem for rainbow trout during a time when juveniles are potentially vulnerable. It is also very important to recognize that the knowledge assessment is not a panacea for everyone and not respectful of tribal perspectives. This is an outstanding item to figure out. The Wiki page is going to be helpful for the workplan especially in a budget year to get access to information very quickly.

Discussion/Q & A

[John McClow, CWCB] If we could get a one-month advance notice of the confluence of temperature and low dissolved oxygen, is there anything that can be done to prevent that? *[Lee Traynham, BOR] The concern is that an operational change could impose detrimental impacts to the facility. The TWG has started to talk about other possible types of mitigation strategies. It is also a spatially confined issue, which gives more options for site specific mitigation.*

[Larry Stevens, Grand Canyon Wildlands Council] An earlier effort of the knowledge assessment was quite complicated and slow, but all that information was compiled in a library. What happened with that? There were also surveys under the Eagle Protection Act. What about those surveys? With golden

eagle populations crashing, we can't afford to ignore them. *[Seth Shanahan, TWG Chair] Not familiar with background information, but the report is on the Wiki page. Will have to look into that back-up information. There had been a recent email string on golden eagle that can be sent to you.*

FY2021-2023 Triennial Budget and Work Plan (download)

Presenter & Affiliation: Seth Shanahan, TWG Chair; Craig Ellsworth, Budget Ad Hoc Group (BAHG) Chair; Lee Traynham, Bureau of Reclamation; Scott VanderKooi, Grand Canyon Monitoring and Research Center

Presentation Summary

To discuss the BAHG process and seek AMWG initial input on the FY21-23 Triennial Work Plan

[Seth Shanahan, TWG Chair] The workplan and budget will reflect your guidance and input. In March 2019, AMWG approved a process that lists what needs to be accomplished by August for document approval. Right now is the discussion of priorities. The first opportunity for AMWG review will be the draft issued in July. Recommendations will then be made to the Secretary in August.

[Craig Ellsworth, BAHG Chair] The first phone call of the BAHG occurred last week to have discussions with BOR and GCMRC. This is now your opportunity to be part of those conversations and communicate stakeholder ideas. The BAHG page on the Wiki will help conduct internal communications and the sharing of information that may be on multiple websites, and not so easy to find. Contact Craig or Peggy to get more information about accessing and using the Wiki.

[Lee Traynham, BOR] We are considering DOI's guidance from August 2019, which was to focus on the LTEMP. All of the efforts that you have heard in this meeting have implications for the program. We have a good baseline in the current workplan. Starting with that we want to identify the things that are working well and then flag those things that are either not working well or where we have enough information. Large programmatic efforts include the monitoring metrics, which are going to take some time to develop as well as track and report. The knowledge assessment can be improved and we have talked about including tribal perspectives. As a federal advisory committee, we can't lobby, but we can communicate better about the purpose of the group, so that might be something to include. We need to have a plan in place for our priorities if we should have a reduction in funding. There should be many opportunities for everyone to engage. If you feel you are not being heard, contact Lee, Scott, Seth or Craig.

[Scott VanderKooi, GCMRC] He keeps hearing questions about the guidance. It was a topic of our first BAHG call. Take a look at the document that Dr. Petty released in August 2019. This is what we will follow. The Science Plan related to LTEMP that was published three years ago underwent a review. Our determination is that the Science Plan does not need to be revised. It is still applicable.

Discussion/Q & A

[Lee Traynham, BOR] What is important to you? What do you want to see to continue? Are there new projects or proposals to consider? Any areas to reduce or things that didn't work out? How do we prioritize? How does it support LTEMP goals and management decisions?

[Larry Stevens, Grand Canyon Wildlands Council] This process within overall LTEMP was to think about where we want to be in 20 years. The Argonne National Lab did all the models that LTEMP is based on such as fish dynamics. Do we have access to those models and how well did they work? **[*Craig***

Ellsworth, BAHG] *Good point. The models for the LTEMP came from GCMRC, some from BOR, and some from Argonne. Most importantly there is documentation. How can those models be kept updated with the latest studies and information that would be useful today or for any process in the future?*

[John Jordan, FFI/Trout Unlimited] The bigger picture for AMWG is that the ultimate decision rests with GCMRC about what is done with the projects. It would be helpful to get from the principal investigators their views on where they are going with those projects. Pure knowledge pursuit drives good science, but it has to be in line with the program. ***[Scott VanderKooi, GCMRC]*** *We will push back a little on that. We will hear from the principal investigators as to what they think is important to continue and what has been sufficiently addressed. Science is not just an end to itself and our role is very much to support this program. We need to meet the stakeholders' needs.*

[Chris Cantrell, AGFD] In previous budget years, our contracts incurred a 10% cut. That is not sustainable. Maybe we should focus on the core needs and then look at the rest of the budget. He would like to see a conversation about utilizing the Native Fish Contingency Fund.

[Larry Stevens, Grand Canyon Wildlands Council] About the planning process, given the uncertainty, establishing some "Plan Bs" would be good to do. For example, if we don't continue bug flows, then what is the next step?

[Jessica Neuwerth, CRBC] We need more information about brown trout life histories. Would like to see more effort studying that species, perhaps similarly to what we did with rainbow trout. We've also seen a booming population of native fish, we need to continue to monitor that and understand what is driving that.

[Steve Wolff, State of Wyoming] We heard a need for a new set of imagery, which is expensive. If it is a new project, someone probably needs to drop off the list. ***[Scott VanderKooi, GCMRC****] It is a big expense, but we have been planning for that. It is a big priority to understand how things are changing over time.*

[John Jordan, FFI/Trout Unlimited] There is no facilitator at this meeting. Where are we at with our science advisor? We have our own areas of interest and we also have to consider giving up something to achieve our most pressing needs. ***[Lee Traynham, BOR]*** *BOR is considering moving forward on that. The science advisor is also a critical piece. The previous contract expired and hope to award that soon.*

[Leslie James, CREDA] We provided input after the annual reporting meeting on what we know in each of the program areas. We heard from Park Service there was an 84% reduction of brown trout in Bright Angel Creek since 2012. Then we made an assumption to cut a million dollars. What are the programs we think can go? Some are regulatory requirements and others are good to know.

[Jan Balsom, NPS-GRCA] It is really important to do the regulatory things. Do we decide to spend less money because something is not yet a big problem? This is basically a risk assessment and each of us needs to do this analysis. Some projects can be delayed, but some have big effects in larger water years. The system seems to be improving; it would be unfortunate to step back from that positive trajectory.

[Larry Stevens, Grand Canyon Wildlands Council] The triennial budget plan is to figure out priorities in this three-year plan. What is our sediment management strategy if we have to have reservoir equalization flows? There is still a lot of work that needs to be done before we get to a springtime HFE.

We need to plan that process. It would be deeply disappointing if there is not a solid plan on how to conduct a springtime HFE. We need to have the data and information in place to answer that.

[John Jordan, FFI/Trout Unlimited] What is the role of the agencies in this process? We have found a string of previous guidance documents on different topics. Have we escaped from the burden of those and can we just focus on relevant current issues? ***[Lee Traynham, BOR]*** *The Secretary ultimately retains decision-making authority. Part of our role, is to get stakeholder feedback, but also to make sure recommendations are feasible and have a good chance of being agreed upon by leadership.*

[Peter Bungart, Hualapai Tribe] We have heard for a long time about the tribes' views of Western science and the prominent paradigm. If we can take one step to recognize that it would have to include a more ecological and comprehensive look about how these dams have changed the resources. We need to bridge the gap between the Western Science model and tribal points of view.

[Peggy Roefer, Colorado River Commission of Nevada] The knowledge assessment might not be the right tool, but we need some tool to understand the resources and what we know about them.

[Kirk Young, USFWS] Do we need to consider to manage temperature? Should we try to work out this TCD application at Glen Canyon to manage these things?

[Larry Stevens, GCWC] Can we have a presentation (in the AMWG) about the plans for constructing these pump storage facilities and proposed new dams?

[Lee Traynham, BOR] Any additional feedback can be sent by email or phone, but we are going to move quickly so feedback is needed sooner rather than later.

Potential Water Year 2020 Experiments (download)

Presenter & Affiliation: Lee Traynham, Bureau of Reclamation and Scott VanderKooi, GCMRC

Presentation Summary

To update AMWG members on the process and possible LTEMP experiments that may be conducted in 2020

[Lee Traynham, BOR] In this Program we're attempting to establish a balance between specific experiments and being flexible with respect to adaptive management. The TWG meets in January for an annual reporting meeting in which we can look at current resource conditions and results from previous experiments. We must notify and offer consultation with the tribes a minimum of 30 days before an LTEMP experiment. We convene a planning and implementation team in advance of implementing any LTEMP experiment. They will make a consensus recommendation to DOI and the Secretary or Secretary's Designee will make the ultimate decision. See table shown of the 2020 LTEMP experiments and timing of the discussions.

[Scott VanderKooi, GCMRC] Current conditions are at 20,000 MT. That sounds like a lot of sand, but the last HFE in fall 2017, we had 750,000 MT. We are a long way from that. Mass balance from Marble Canyon is typically what we see from operations. We are not on a trajectory to do a spring HFE unless something extraordinary happens. One potential experiment is to continue the bug flows into Round 3.

[Lee Traynham, BOR] Bug flow implementation is May through August. Trout management flow (TMF) is designed to disadvantage trout. The TWG team had concerns about whether we were really prepared

for this experiment and our knowledge gap. We know that tribal consultation is an important and necessary component of initiating TMFs. Hope to start that. One item not included is the potential for power plant capacity flows. We would like that to be on the table, too.

Discussion/Q & A

[Leslie James, CREDA] Regarding bug flows Part 3, will that process incorporate when a synthesis report will be available from all three years of work to make future decisions? We need to make that part of the decision-making process in the workplan. How do we talk about the apron maintenance thing? It is not an experiment, but it is a learning opportunity. ***[Scott VanderKooi, GCMRC]*** *That might be more important for the workplan. It is important and needs to be part of the discussion.* ***[Lee Traynham, BOR]*** *The TWG would be good place to talk about the apron maintenance project.*

[Larry Stevens, Grand Canyon Wildlands Council] Are the vegetation manipulations expected to continue? Is there a study deign and study controls? ***[Rob Billerbeck, NPS]*** *We had a good meeting with GCMRC on Monday and we see the role of vegetation removal on beach encroachment to continue.*

[John Jordan, FFI/Trout Unlimited] The potential was to have one week of very reduced flows. Thought that was related to structural repairs versus a natural reduced flow from the lump. Also, when we have the discussion about spring HFEs, if we have that event, we might still proceed with caution about having that when we are prepared rather than if it happens. In discussing the process of getting tribal perspectives, what are the answers to their questions? Do we have the answers to implement a TMF? ***[Lee Traynham, BOR]*** *The reduced flows are two separate things, but someone raised a concern about looking at both.* **[*Scott VanderKooi, GCMRC]** *As to the spring HFEs, we see them in terms of monitoring. The way we structure those monitoring programs, they will get at whether the event happens in spring or fall. It has been 12 years since we had a spring flow like that occur. It would be good to prepare, but we still have baseline monitoring currently in place for physical, biological, and cultural resources. Related to trout management flows, we need to think through that information again. We know a lot about rainbow trout, but we may have plateaued on our predictive capabilities.*

[David Brown, GCRG] About "the bump," 4,000 CFS is still not an inconsequential amount of water so it might not be as advantageous as some people think. We need to complete the study about being a spring HFE to be prepared for that.

Final thoughts and Public Comment

[Kelly Burke, GCWC] Supports having a facilitator. It is like insurance – you don't need it until you do need it. In regards to Dr. Petty's guidance memo, be careful about simplifying it down to the things on the slides. Also in that memo is the directive to look at spring experiments. Grateful for that and we should be mindful of it. That memo also didn't replace the guidance memos of the past, which are important to remember as well. We start to lose the adaptive management perspective if we only look at the LTEMP.

Wrap-Up

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

This was really great engagement and to see all the new people. We still have open positions. When he met with Secretary Bernhardt last fall, he fully recognized the decade of research, monitoring, and other

work that supported development of the LTEMP EIS and that everyone participated in that process. It is up to this group to help bring the projects back to our priorities and what is legally binding us. This is what this committee is all about. The TWG has some of the best work being accomplished. We are getting great input from them. It is an informed decision when that information is presented to the Secretary. This is also one of the few basins that is not being controlled by a judge who will not think of all the areas that are needed and what is most important to the resources.

Important dates:

- May 20, 2020 – AMWG webinar
- August 19-20 next in-person meeting
- January 20-22, 2021 – next reporting meeting

Meeting Adjourned at 3:00 pm MST

Meeting Attendees–Wednesday, February 12, 2020

AMWG Members, Alternates, and Leadership

Jan Balsom, NPS-GRCA
Cliff Barrett, UMPA (webinar)
David Brown, GCRG
Peter Bungart, Hualapai
Kathleen Callister, BOR
Chris Cantrell, AGFD
Brent Esplin, BOR
Kevin Garlick, UMPA
Leslie James, CREDA
Steve Johnson, WAPA
John Jordan, FFI/Trout Unlimited
Charles "Chip" Lewis, BIA
John McClow, State of Colorado
Jessica Neuwerth, Colorado River Board of California
Timothy Petty, DOI and Secretary's Designee
Daniel Picard, BOR
Richard Powskey, Hualapai Tribe
Peggy Roefer, Colorado River Commission of Nevada
Brian Sadler, WAPA
Steve Wolff, State of Wyoming
Kirk Young, USFWS

USGS/GCMRC Staff

Helen Fairley
Ted Kennedy (webinar)
David Lytle
Michael Moran
Scott VanderKooi

Bureau of Reclamation Staff

Tara Ashby
Heather Patno
Alex Pivarnik
Jennifer Scheel
Lee Traynham
Chris Watt

Interested Persons

Rob Billerbeck, NPS
Charley Bulletts, SPC
Danielle Carmon, NPS-GLCA
Tom Chart, USFWS
Winkie Crook, Hualapai Tribe
Kurt Dongoske, Pueblo of Zuni
Sinjin Eberle, American Rivers
Craig Ellsworth, WAPA
Michelle Garrison, State of Colorado
Jessica Gwinn, USFWS
Jeff Humphry, USFWS
Ken Hyde, NPS-GLCA
Sara Larsen, UCRC
Arden Kucate, Pueblo of Zuni
Jakob Maase, Hopi Tribe
Craig McGinnis, State of Arizona
Theresa Pasqual, Joint Tribal Liaison
Richard Begay, Navajo Nation
Erik Skeie, State of Colorado Rod Smith, DOI

Webinar Attendees

Kelly Burke, GCWC
Kevin Dahl, National Parks Conservation Association
Alicyn Gitlin, Sierra Club
Paul Harms, State of New Mexico
Ryan Mann, AGFD
Kevin McAbee, USFWS
Lisa Meyer, WAPA
Emily Omana Smith, NPS

Meeting Attendees, Thursday, February 13, 2020

AMWG Members, Alternates, and Leadership

Jan Balsom, NPS-GRCA
David Brown, GCRG
Peter Bungart, Hualapai Tribe
Kathleen Callister, Reclamation
Chris Cantrell, AGFD
Brent Esplin, BOR
Kevin Garlick, UMPA
Leslie James, CREDA
Steve Johnson, WAPA
John Jordan, FFI/Trout Unlimited
Charles "Chip" Lewis, BIA
John McClow, State of Colorado
Jessica Neuwerth, Colorado River Board of California
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USGS/GCMRC Staff

Helen Fairley
Dave Lytle
Michael Moran
Scott VanderKooi

Bureau of Reclamation Staff

Tara Ashby
Heather Patno
Alex Pivarnik
Jennifer Scheel
Lee Traynham
Stacie Wylie
Chris Watt

Interested Persons

Richard Begay, Navajo Nation
Rob Billerbeck, NPS
Kurt Dongoske, Pueblo of Zuni
Sinjin Eberle, American Rivers
Craig Ellsworth, WAPA
Jessica Gwinn, USFWS
Jeff Humphrey, USFWS
Ken Hyde, NPS
Arden Kucate, Pueblo of Zuni
Jakob Maase, Hopi Tribe
Seth Shanahan, TWG Chair and SNWA
Erik Skeie, State of Colorado

Webinar Attendees

Cliff Barrett, UMPA
Kevin Dahl, National Parks Conservation Association
Alicyn Gitlin, Sierra Club
Paul Harms, State of New Mexico
Vineetha Kartha, Arizona Department of Water Resources
Ryan Mann, AGFD
Kevin McAbee, USFWS
Lisa Meyer, WAPA
Emily Omana Smith, NPS
Jeffrey Woner, Arizona Tonopah Irrigation District

Abbreviations

ADWR – Arizona Department of Water Resources
AMP – Adaptive Management Program
AMWG – Adaptive Management Work Group
AGFD – Arizona Game and Fish Department
BAHG – Budget Ad Hoc Group
BOR – Bureau of Reclamation
cfs – cubic feet per second
CRBC – Colorado River Board of California
CREDA – Colorado River Energy Distributors Association
CWCB – Colorado Water Conservation Board
DOI – Department of the Interior
EA – Environmental Assessment
EIS – Environmental Impact Statement
ESA – Endangered Species Act
FACA – Federal Advisory Committee Act
FEIS – Final Environmental Impact Statement
FFI – Fly Fishers International
FLAHG – Flow Ad Hoc Group
FONSI – Finding of No Significant Impact
FY – Fiscal Year (October 1 – September 30)
GCDAMP - Glen Canyon Dam Adaptive Management Program
GCMRC – Grand Canyon Monitoring & Research Center
GCRG – Grand Canyon River Guides
GCWC – Glen Canyon Wildlands Council
GPP – gross primary productivity
GRCA – Grand Canyon National Park
HFE – High Flow Experiment
km – kilometer
MSCP – Multi-Species Conservation Program
LTEMP – Long-Term Experimental and Management Plan
MT – metric ton
MW – megawatt
NFWF – National Fish and Wildlife Foundation
NPS – National Park Service
QSA – Quantification Settlement Agreement
Reclamation – Bureau of Reclamation
ROD – Record of Decision
Secretary – Secretary of the Interior
SNWA – Southern Nevada Water Authority
SRP – soluble reactive productivity
SSA – Species Status Assessment
TMF – Trout Management Flows
TWG – GCDAMP Technical Work Group
UMPA - Utah Municipal Power Agency
USFWS – United States Fish & Wildlife Service
USGS – United States Geological Survey
WAPA – Western Area Power Administration