

Glen Canyon Dam Adaptive Management Program Adaptive Management Work Group Meeting February 10-11, 2021

Wednesday, February 10, 2021

Start Time: 8:30 am Pacific Standard Time (PST)

Conducting: Wayne Pullan, Acting Secretary's Designee to the Adaptive Management Work Group

Recorder: Carliane Johnson, SeaJay Environmental, LLC.

Facilitator: J. Michael Harty, Kearns & West, Inc.

Welcome and Administrative

Presenters & Affiliation: Wayne Pullan, Acting Secretary's Designee to the Adaptive Management Work Group (AMWG).

Introductions and Determination of Quorum (13 members)

[Wayne Pullan, AMWG Chair] The DOI is transitioning to a new Administration. Tanya Trujillo has been delegated the responsibilities of Assistant Secretary for Water and Science, and Camille Touton has been delegated the responsibilities of Deputy Commissioner of the Bureau of Reclamation (Reclamation). They will join future AMWG meetings and both have been involved in AMWG in the past. Also joining the meeting today are Daniel Picard who serves as Deputy Regional Director of the Upper Colorado Basin Region and is the Acting Designated Federal Officer, and Kerry Rae who is the Chief of Staff in the Office of the Assistant Secretary for Water and Science. Last week, a spring disturbance flow was approved for implementation after receiving a consensus recommendation by the Glen Canyon Leadership Team. This exemplifies the collaborative, science-based approach to ensure that Glen Canyon Dam operations are done in coordination with the protection of resources. **[Mike Harty, Kearns & West Facilitator]** Roll call taken, and a quorum was reached with 20 members represented.

Approval of August and November 2020 Meeting Minutes

August minutes approval moved by: Larry Stevens, Grand Canyon Wildlands Council (GCWC)

Seconded by: Steve Wolff, State of Wyoming

The minutes from the August 19-20, 2020 meeting, as distributed on February 4, 2021, were passed by consensus.

November minutes moved by: Larry Stevens, GCWC

Seconded by: Steve Wolff, State of Wyoming

The minutes from the November 17, 2020 meeting, as distributed on December 22, 2020, and with additional minor edits to page 2 proposed by Larry Stevens, were passed by consensus.

Administrative Updates

[\[PRESENTATION\]](#) **[Lee Traynham, Reclamation]**

- **DOI leadership.** Another item regarding leadership transitions at the U.S. Geological Survey (USGS). Scott VanderKooi is acting as the Southwest Biological Science Center (SBSC) Director and Mark Wimer is filling in as the GCMRC Chief.
- **Executive Orders (E.O.s) and Secretarial Orders (S.O.s)** E.O. 13990 rescinded a prior order regarding the streamlining of the National Environmental Policy Act (NEPA). It is not yet known how this E.O. will affect the agencies. S.O. 3395 pauses Federal Register notices and other actions to give the new Administration time to better understand and provide guidance.
- **AMWG Membership Status** A Federal Register notice soliciting nominees is anticipated. It is recommended that anyone with a vacancy or a term that ends in Fiscal Year (FY) 2021 submit a nominee. Steve Johnson, Western Area Power Administration (WAPA) and Vineetha Kartha, Arizona Department of Water Resources (AZDWR), have both departed.
- **FY2021 Program Funding Status** The Appropriations Act for FY21 included direction from Congress for hydropower revenues to support the Colorado River Storage Project (CRSP) environmental programs. This includes the Glen Canyon Dam Adaptive Management Program (GCDAMP), which will receive full funding at the same levels as FY20.
- **Action Item Tracking Report** The outstanding items are related to the development of monitoring metrics and streamlining of GCDAMP guiding documents. There is funding in the FY21-23 TWP for these items.

FY 2020 Accomplishments and FY 2021 Outlook: Lee Traynham, Adaptive Management Group Chief, Bureau of Reclamation

[\[PRESENTATION\]](#) **[Lee Traynham, Reclamation]** Provided an overview of GCDAMP accomplishments in FY20 and the outlook for FY21.

2021 GCDAMP Annual Reporting Meeting Update – Part 1: Moderated by Mark Wimer, Acting Chief, Grand Canyon Monitoring and Research Center

[\[PRESENTATION 1 – Sediment\]](#) **[David Topping, GCMRC]** Overview presented of sand supply transport and deposition. As much as 30-50% of the sand mass balance is relic from before dam construction. Fine sand is needed to get deposition on the sandbars. High flow experiments (HFEs) must be timed when there is fine sand on the riverbed. The takeaway is that, for the recent past, scientists are not seeing a response in the system to average conditions either during dam releases or from the Paria River sand supply. The management question now is: how should equalization occur during high dam releases in which sand is not being replaced?

[\[PRESENTATION 2 - Riparian Vegetation Science and Management\]](#) **[Joel Sankey, GCMRC]** This presentation is a summary of vegetation management projects completed during the 2018-2020 TWP. Comparing historical and present-day photographs has basically shown more vegetation today, particularly on sandy habitats, than three decades ago when the first Record of Decision (ROD) for Glen Canyon Dam was finalized. A summary of NPS vegetation management projects was also provided. More detailed information is in the draft [LTEMP Riparian Vegetation Project Plan](#).

Lower Colorado River Multi-Species Conservation Program (MSCP) Overview: John Swett, Program Manager, Bureau of Reclamation

[\[PRESENTATION\]](#)

[John Swett, Reclamation] There are four big conservation programs on the Colorado River: two for native fish in the Upper Basin that support compliance with the Endangered Species Act (ESA) recovery actions by US Fish and Wildlife Service (USFWS); the GCDAMP; and the [MSCP](#). The MSCP is a partnership of 56 different entities. It is a unique program that helps member agencies with ESA compliance (not recovery) under both Sections 7 and 10. The MSCP started in 2005 and is flexible to address current conditions as well as species that may become listed, which is what happened for the yellow-billed cuckoo. The two biggest program components are “Fish Augmentation” and “Conservation Area Development & Management.” Four native species are covered under the MSCP Fish Augmentation component; three of these (humpback chub, razorback sucker, bonytail) are ESA listed. The main issue for native fish is non-native fish predation. Native fish are grown in hatcheries to give them a chance of survival after stocking. Lake Mohave is considered the brood stock for razorback sucker where larval fish are collected. Bonytail are functionally extirpated from the Lower Colorado River so all their brood stock come from hatcheries in New Mexico. The MSCP Conservation Area Development & Management component involves large construction projects for acreage commitments that were made by each of the states. About 75% of needed habitat has been built with good response by most riparian and marsh species. The Southwestern Willow Flycatcher is the only species that has not responded to created habitat. Challenges that exist for the program includes finding bonytail even after a stocking and finishing the last 25% of habitat creation. Probably the biggest reason for the MSCP’s success has been the engagement of its Steering Committee.

Q&A and discussion

[Larry Stevens, GCWC] Have you heard of the Silent Forest Syndrome where habitat is created but the species do not return, such as for Southwestern Willow Flycatcher? What extent do you see this pattern? What are the biggest surprises in the program? **[John Swett, Reclamation]** Southwestern Willow Flycatcher is the one terrestrial species that does not breed in these conservation areas. The rest of the species moved into the habitat relatively quickly. Yellow-billed cuckoo is probably the biggest success story. It was rare prior to MSCP building this habitat and it is now probably the largest population in the Western US. The MSCP has a robust monitoring and management program to see whether species are responding and to be able to react, as needed. **[David Ward, GCMRC]** Why is Colorado Pikeminnow not included in the ESA Covered Species? **[John Swett, Reclamation]** Pikeminnow is believed to have been extirpated from the Lower River so it was not covered. **[Leslie James, Colorado River Energy Distributors Association (CREDA)]** Could you provide the federal authorizing bill number? **[John Swett, Reclamation]** MSCP initially used Reclamation authorities, but federal partners wanted something more concrete. The [2009 Omnibus Land Management Act](#) includes a section that codified the MSCP.

Stakeholder’s Perspective—American Rivers: Matt Rice, Colorado River Basin Program Director, American Rivers

[\[PRESENTATION\]](#) **[Matt Rice, American Rivers]** American Rivers is a national organization with a mission to protect wild rivers – life needs rivers. In the Colorado River Basin, American Rivers got established

about 10 years ago. Most recently, American Rivers was involved in establishing the drought contingency plans, Reclamation funding, the Farm Bill, and other projects such as restoration of the Colorado River headwaters and conservation of consumptive uses with stakeholders. American Rivers has a long (40-year) experience on large, complex water projects.

Q&A and discussion

[Larry Stevens, GCWC] One prominent feature of the Grand Canyon is the 50 perennial tributaries that come into the mainstem and problems there (such as quagga mussel) can affect the tributaries. Have you encountered this dynamic in other areas and how can we ensure the protection of these tributaries? **[Matt Rice, American Rivers]** There are similar analogs throughout the country. American Rivers does not have all the answers but would be happy to talk further about this issue. In its founding in 1973, American Rivers was intended to advance new wild and scenic protection. There are more tools available now for protection efforts. **[Helen Fairley, GCMRC]** Can you elaborate on the relationship between the National Parks Conservation Association (NPCA) and American Rivers? **[Matt Rice, American Rivers]** American Rivers partners with NPCA.

Basin Hydrology and Operations: Heather Patno, Hydraulic Engineer, Bureau of Reclamation

[PRESENTATION] **[Heather Patno, Reclamation]** The Upper Basin is currently in decreasing storage, which is typical until inflows come in. Overall seasonal precipitation remains below normal, and poor runoff projections are exacerbated by dry soils, which will absorb runoff to saturation points prior to runoff reaching reservoirs and increasing storage. All three forecasts (min/max/most probable) of Lake Powell unregulated inflows are below average. Reclamation is currently operating in the Upper Elevation Balancing Tier for WY2021 and anticipates releasing 8.23 million acre-feet (maf) from Glen Canyon Dam. WAPA has requested modest adjustments to the monthly release pattern in the LTEMP ROD, which will be incorporated into the February 24-month study. For WY2022, the minimum and most probable forecast scenarios are projecting a 7.48 maf release. The maximum probable remains in an Upper Elevation Balancing Tier with projected release of 8.23 maf.

Under the minimum probable forecast scenario, Lake Powell is projected to go below 3,525 feet beginning in March 2022. The 2019 Agreement Concerning the Colorado River Drought Contingency Management and Operations and associated Drought Response Operations Agreement (“DROA”) outlines a mitigation process when conditions are projected to go below 3,525 feet. The model results are in the minimum probable, which only initiate enhanced monitoring and coordination as well as more frequent analysis of the min/max/most probable. Level 1 shortage conditions are forecasted in Lake Mead by end of WY2021.

Unit outage schedules for WY2021 and WY2022 were also presented. Glen Canyon Dam will start to reduce releases on March 15 for the apron repair. This will extend for 120 hours (until March 20) until Glen Canyon ramps up for the spring disturbance flow. Temperature projections show impacts from decreasing elevations. Conditions may be good in Western Grand Canyon for humpback chub spawning and growth with these increased temperatures. From a longer historical perspective, and with decreasing elevation, there is the potential for low dissolved oxygen (DO) in Glen Canyon.

Q&A and discussion

[Kirk Dongoske, Pueblo of Zuni] What would temperatures look like if Lake Powell dropped to the minimum probable? **[Heather Patno, Reclamation]** Those slides are not available today, but that is information that can be presented at the next AMWG meeting. **[David Topping, GCMRC]** When is the first November that a full-value (~45,000 cfs) HFE can be conducted? **[Heather Patno, Reclamation]** The reservoir elevation may limit the discharge of an HFE. Full capacity cannot be achieved with current elevations. When that could be conducted depends on hydrology as well as maintenance. Reclamation will assess a 45,000 cfs HFE in the future and will notify the group if that event might occur. **[John Hamill, Fly Fishers International/Trout Unlimited (FFI/TU)]** Conditions look good for humpback chub, but higher temperatures are also good for establishment of non-native fish, which is a concern. Temperature devices and DO need to remain as high priorities. There is no mitigation plan for low DO concerns and responses.

Hydropower Resource - Updates and Emerging Issues: Tim Vigil, Colorado River Storage Project Manager, Western Area Power Administration

[PRESENTATION] **[Tim Vigil, WAPA]** The WAPA CRSP joined the Western Energy Imbalance Market (referred to as “market light”) in 2021. The Energy Imbalance Market and the Regional Transmission Organization (which is referred to as a “full market”) are organized markets rather than bilateral markets with buyers buying and selling, although this still exists. Organized markets are more complicated and more efficient. They are needed because energy generation must match a load of 60 hertz or else things will stop working. These markets pool their energy generation based on demands of the grid and keep the grid reliable. The California Independent System Operator (CAISO) Extended Day-Ahead Market is in between market light and market heavy; it is not as efficient. Resource adequacy is having enough electricity to cover demand. Because CAISO ran out of energy last year, they are conducting Resource Adequacy review. As more solar and wind comes online, which is unstable and cannot be controlled, resource adequacy becomes more critical and these markets can more effectively balance this system. Since WAPA is a regional organization, each region also decides what works best for them. Under the Glen Canyon Emergency Exception Criteria, if there is available capacity, WAPA will respond to address shortages and ensure security of the grid. In 2021, CAISO has been the only one to ask for emergency resources from WAPA in over a decade. **[Brian Sadler, WAPA]** WAPA started its FY2021 Basin Fund with \$116.8 million, which was quite a bit short of its target of \$174 million. Expecting a 7.48 release out of Glen Canyon Dam, which requires additional purchase power in both FY22 and FY23. This will drop the Basin Fund to \$41.7 million by the end of FY23. WAPA is discussing ways to mitigate this.

Q&A and discussion

[Sara Price, Colorado River Commission of Nevada (CRCN)] Are the costs going up because WAPA is purchasing more off-market energy? **[Brian Sadler, WAPA]** Those are net purchase power costs over a full year. If power generation is lower than what is required to be delivered in the contracts, then the costs will be higher. **[Larry Stevens, GCWC]** Would the proposed Lake Powell Pipeline have an impact on power production? **[Brian Sadler, WAPA]** Yes there is, but WAPA is not ready to discuss those impacts yet. This is something Reclamation has asked WAPA to model. **[Melissa Trammell, NPS]** Does that projected balance include the transfer of \$21 million to the Treasury as well as to Reclamation for upper

basin recovery programs? **[Brian Sadler, WAPA]** This is going to be discussed tomorrow by Kathy Callister, but the \$21 million for this year and next will be transferred to Reclamation.

2021 GCDAMP Annual Reporting Meeting Update – Part 2: Mark Wimer, Acting Chief, Grand Canyon Monitoring and Research Center

[\[PRESENTATION - Nutrients, Primary Production, and the Colorado River Foodbase\]](#) **[Bridget Deemer, GCMRC]** The conceptual model of the Colorado River food web shows that it is food limited. The primary producers are an important source of carbon which cascades up the food web. These are predominately regulated by light and nutrients that can limit growth and production. In Grand Canyon, phosphorus is the most limiting nutrient. In Glen Canyon, which has clear water conditions, phosphorus is an important regulator of food web dynamics. There is a fair degree of uncertainty and variability in the amount of biologically available Soluble Reactive Phosphorus (SRP) concentrations, which is reflected in the food base. For example, as phosphorus increases so does aquatic insect drift density. More biologically available phosphorus affects primary production downstream, and it is often found that SRP values are higher below the penstock. The role of flow also affects higher trophic levels. An unanticipated consequence of the macroinvertebrate production flows (or “bug flows”) was a reduction in river turbidity resulting in an increase in gross primary productivity (GPP) because of an increase in light. During the weekend with these steady flows, GPP increased by 45%, which generally held true from river mile 60 to river mile 250. **[Ted Kennedy, GCMRC]** The goals of bug flows included improving insect diversity and abundance to improve and sustain natural processes. GCMRC is seeing benefits to other processes that sustain this ecosystem. The remainder of the presentation showed new results on the bug flow angling study to determine effects of food availability on short-term scales.

Q&A and discussion

[Sara Price, CRCN] With food availability because of more production, is this just affecting midges or are other flies found in the stomachs of non-native fish? What is your level of confidence in the caddisfly increase? Is there value across the board to all aquatic insects from what is increasing production? **[Ted Kennedy, GCMRC]** The caddisfly increases are happening in Grand Canyon. They start showing up around River Mile 16 and they are strong all the way to Lake Mead. GCMRC has not done a comprehensive assessment of fish feeding habits in Grand Canyon for about a decade. Project F.4 is to tackle this question and look at native fish feeding habits in Grand Canyon. The data is clear that bug flows benefit all parts of the insects’ life cycle. The specific reason for the caddisfly increase may be less certain. It is believed that steady flows are going to make the emergence process easier, but the weekend data is only able to show increases in midges. The same thing may be occurring for caddisfly, but it is difficult to tease that out in the data, but it is believed that the benefit to the emergence process applies to all insects.

[\[PRESENTATION - Fishes\]](#) **[David Ward, GCMRC]** This presentation provided a summary of monitoring, research studies, and management actions. The numbers of brown trout (non-native) exploded in 2017 and 2020 and they grow much better than rainbow trout, which shows an inverse relationship between abundance and body fat. There is some correlation of immigration of brown trout to Lees Ferry with high flows. Humpback chub monitoring work with the USFWS shows some of the highest population estimates ever seen in the Little Colorado River. One of the management triggers is for the spring subadult population in the Little Colorado River to stay above 1,250 fish. Survival graphs are being generated to assess risk of predation to humpback chub from small and large bodied non-native species.

Modeling is being used to determine whether translocations are more cost effective than trout removals, which suggests that it is in most years. At Bright Angel Creek, the NPS has been removing brown trout since 2012, and if that work stops, the fish will come right back. NPS is translocating humpback chub and modeling those populations. Mainstem fish monitoring shows that brown trout are decreasing over time throughout the rest of the Grand Canyon. Other monitoring is showing that increases in humpback chub and flannelmouth suckers are occurring in Western Grand Canyon. As temperatures increase, this is resulting in higher levels of humpback chub. Pearce Ferry above the rapid is all natives and it is all non-natives below the rapid, which indicates that the rapid could be acting as a barrier.

Q&A and discussion

[Bill Persons, FFI/TU] Where did channel catfish go? **[David Ward, GCMRC]** Used to have a lot of channel catfish in Western Grand Canyon, but conditions are not great for spawning. Since channel catfish live only 8-10 years and cannot spawn, they have died off and have not been replaced. It is believed this is why native fish are doing so well in Western Grand Canyon. **[Larry Stevens, GCWC]** There used to be a lot of big channel catfish in Little Colorado River. What is their status now? **[David Ward, GCMRC]** There are still a lot in the Little Colorado River. There is a project in the current TWP to quantify their population and determine their impacts. **[Kelly Burke, GCWC]** Regarding the bug flows, Ted Kennedy's presentation included a chart that showed greatest risk to humpback chub was low food supply, and then there is also the consideration of why they are doing so well in Western Grand Canyon. What is the relative risk from non-natives versus low food supply? Would non-natives outstrip the food supply? **[David Ward, GCMRC]** It all depends on how many fish there are; with tons of fish Western Grand Canyon, there is limited food. In general, the concern is predation by invasive species, such as when there is warmer water coming out of the dam.

Public Comment

None.

Action Items

[Lee Traynham, Reclamation] Heather Patno will follow up on the question about the temperatures below the dam if elevations at Lake Powell fall below projected minimum probable levels.

Meeting adjourned at 3:07 PST

Thursday, February 11, 2021

Start Time: 8:31 am Pacific Standard Time (PST)

Conducting: Wayne Pullan, Acting Secretary's Designee to the Adaptive Management Work Group

Recorder: Carliane Johnson, SeaJay Environmental, LLC.

Facilitator: J. Michael Harty and Kearns & West team.

Welcome and Administrative: Wayne Pullan, Acting Secretary's Designee to the Adaptive Management Work Group

Introductions and Determination of Quorum (13 members)

[Wayne Pullan, AMWG Chair] Thanks to the facilitator, Michael Harty, and to Lee and Tara, for technical support. **[Michael Harty, Facilitator]** Quorum is met with 19 members.

Federal Agency Updates

GCDAMP Program Funding short-term and long-term (*BOR, WAPA*)

[Kathy Callister, Reclamation] The FY21 Consolidated Appropriations Act was signed into law in December, which requires WAPA to transfer \$21.4 million to Reclamation for stewardship and endangered species recovery efforts. Reclamation continues to seek strategies for that funding in the future. Currently working on the FY23 budget process but will not know about that until February 2022.

[Tim Vigil, WAPA] Only thing to add is that WAPA is looking at \$12.5 million per year in hydropower revenues for environmental funding for FY23 and on.

ESA Update: Humpback chub, Razorback sucker, Kanab ambersnail (*USFWS*)

[Kirk Young, USFWS] The Species Status Assessment and five-year review, which were completed in 2018, recommended downlisting the humpback chub. The proposed rule was published in January 2020 and comments closed in March 2020. The Navajo Nation requested government-to-government consultation, which concluded in September 2020. The final rule is not yet published. A razorback sucker Species Status Assessment was also completed in 2018. The proposed rule timing was slated to follow the humpback chub rule. The packet is waiting for the USFWS Director's signature. Anticipate having a rule proposing reclassification this spring. Delisting was recommended for the Kanab ambersnail. That packet was withdrawn from publication because of the regulatory freeze. Once the final rule is published, this species will fall under the state wildlife authorities. The Arizona Game and Fish Department (AZGFD) has expressed their desire to still manage these populations as sensitive species.

Non-native Aquatic Species Management Plan (*NPS*)

[Ken Hyde, NPS] Green sunfish, which are in the slough about three miles downriver from Glen Canyon Dam, were collected after the slough was pumped out last fall. The fish had to be put in a quarantine tank, where they were going to be held for 2 to 3 weeks, and some died. About 350 were transferred to Lake Powell. This was done to support agreements with the tribes to minimize the taking of life. Regarding the incentivized harvest that started November 2020, still not seeing the preferred harvest numbers because of high COVID levels and lack of tournaments. About 20 anglers harvested 118 fish but had been hoping for 200 per month to get the population numbers down. Will probably do an event in April. This will not be a tournament. Instead it may involve an increase in payments and getting more anglers interested.

[Leslie James, CREDA] Would NPS ever reconsider dredging the slough? **[Ken Hyde, NPS]** Went through a detailed review of that with Reclamation. Because the river flow goes up and down from 8,000 to 18,000 CFS, it would have to be a large channel and an extensive canal for the water to flow through there.

[Jess Gwinn, USFWS] Has the NPS given any thought to additional removals throughout the year in consideration of warming water temperatures? **[Ken Hyde, NPS]** There were some areas in Grand Canyon where sunfish were found, which will continue to be monitored to make sure they do not become hotspots, but this has been well addressed. It is the Little Colorado River, Kanab Creek, and some other places that need to be watched.

LTEMP Litigation (DOI Solicitors Office)

[Rod Smith, Reclamation] Save the Colorado, Living Rivers, and Center for Biological Diversity sued Reclamation in October 2019—a few years after LTEMP was enacted. Have not had a chance to argue the case yet due to procedural issues, specifically the scope of the administrative record. Last week, the court ruled that the government’s view of the administrative record was correct. A timetable to proceed has now been set. The plaintiffs have until March 5 to respond to that decision. It is hoped that by the time of the next AMWG, Reclamation will be in the middle of substantive briefings.

Stakeholder Updates

States: AZDWR, AZGFD, CA, CO, NM, NV, UT, WY

[Craig McGinnis, AZDWR] AZDWR has begun deliberations for the reconstituted guidelines. **[Julie Carter, AZGFD]** Is the new aquatic wildlife branch chief. **[Jessica Neuwerth, Colorado River Board of California (CRBC)]** No updates. **[John McClow, State of Colorado]** No updates. **[Arianne Singer, State of New Mexico]** The state continues to work with Navajo Nation on the Navajo Gallup Water Supply Project construction. The Cutter Lateral pipeline was finished last year and water is starting to come through. Now working on getting the San Juan Lateral operational. **[Sara Price, CRCN]** The state is very engaged in setting up for the renegotiations and spending time on the modeling, and in particular, to improve the modeling to address banked water. **[Scott McGettigan, State of Utah]** Utah is working with all basin states regarding concerns associated with the Lake Powell Pipeline. Also working with Reclamation on drafting a supplemental environmental impact statement (EIS), which is targeted for release this summer. **[Steve Wolff, State of Wyoming]** The state continues to work on demand management feasibility studies.

Tribes: Hopi, Hualapai, Navajo Nation, Pueblo of Zuni, Southern Paiute

[Jakob Maase, Hopi Tribe (Hopi)] The Hopi remain in lock down, but the reservation is planned to reopen on March 21. The next river trip is planned for September. **[Peter Bungart, Hualapai Tribe (Hualapai)]** Fall monitoring because of COVID was abbreviated to just a trip in the Lower canyon. A full river trip is planned for early September. One other project is archiving recordings from previous river trips. The tribe recently received a hard drive with 7 terabytes of files (4,000 unique clips) that will also be archived. **[Larry Stevens, GCWC]** Will those recordings be made available to the program? **[Peter Bungart, Hualapai]** Some will be considered sensitive and would not be available to the public, but some may be available for broader use. That will be considered a longer-term endeavor. **[Richard Begay, Navajo Nation (Navajo)]** No updates. **[Arden Kucate, Pueblo of Zuni]** Would like to take a look at Zuni participation in terms of management initiatives related to the Programmatic Agreement. The Governor

and Tribal Council need to look at Pueblo of Zuni involvement in these initiatives to make sure everyone is on the same page. Because of COVID, Pueblo of Zuni will not be considering any river trips this year. Priority areas need to be reviewed to make sure there is a good overlap with the activities of the Cultural Resources group. **[Daniel Bullets, SPC]** Is the new Director for the Southern Paiute Consortium. The tribe has been disconnected to their sacred areas. SPC is making an effort for a river trip this year. It is scheduled for June and hope to have a full boat if COVID restrictions are lifted.

NGOs: Environmental, Federal Power Purchasers, and Recreation

[Larry Stevens, GCWC] The GCWC is engaged with GCRA and GCNP to undertake a riparian restoration project at Paria Beach to remove tamarisk and replace it with native vegetation. A couple of publications of interest are: 1) ground water and springs of the Colorado River Basin and 2) on benthic anoxia that dominates the tailwater section down to Lees Ferry. These will be made available to the GCDAMP. **[Kelly Burke, GCWC]** There is also a substantial component of the project at Paria Beach to create an outdoor classroom. **[Matt Rice, American Rivers]** American Rivers is beginning to think about the renegotiation of the guidelines and how to ensure that scope includes Grand Canyon priorities. Also working with Jack Schmidt with the Center for Colorado River Studies about his report with Kevin Wheeler to identify additional modeling needs. Depending on COVID, a river trip is planned in the fall with key stakeholders. **[John Hamill, FFI/TU]** Jim Stroger and others at FFI/TU have been actively promoting the incentivized harvest program for brown trout at Lees Ferry. **[David Brown, Grand Canyon River Guides (GCRG)]** GCRG is scheduling a virtual Guides Training Seminar in April. Let David know if interested. The latest issue of the Boatman's Quarterly Review has an article on the Glen Canyon Dam and Stuart Udall as well as the Grand Canyon Protection Act. Other issues can be found here for those interested:

<https://www.gcr.org/bqr.php>. **[Leslie James, CREDA]** Brian Sadler's presentation on Day 1 showed the current hydrology and drought impacts on WAPA's contracts and basin power commitments, which is affecting the Basin Fund. The member utilities at CREDA are non-profits and are also dealing with COVID impacts from utility disconnects. Business closures are having a trickle-down effect. **[Kevin Garlick, Utah Municipal Power Agency (UMPA)]** UMPA is a consumer of electricity that is distributed to its members. The impacts associated with drought conditions and with production of generation are affecting other non-federally owned facilities. Market impacts are going to affect UMPA, which is a non-profit agency.

[Wayne Pullan, AMWG Chair] With the new administration, and as someone new to this role, it would be good to discuss the role of the AMWG. The following questions were posed to the group: What are the things new leadership should know? What are the challenges we should consider? What processes could we improve? Are there successes that could be leveraged to create greater successes?

[Sara Price, CRCN] As one of the newest members, it would be helpful to have more in-depth information about the funding of the program especially with the recovery programs, the drought, and the plan going forward regarding the deficit. **[Wayne Pullan, AMWG Chair]** This is a high priority for Reclamation, which can commit to bring people up to date on this and to include more context on these long-term funding discussions. **[Sara Price, CRCN]** What are the forums in which these discussions are taking place? **[Wayne Pullan, AMWG Chair]** There is a group of non-federal and federal entities that are meeting on a regular basis that are talking about approaches. **[Steve Wolff, State of Wyoming]** Agree with Sara that funding for this program as well as the Upper Basin programs is a priority. There is a report due to Congress that is supposed to outline how these programs will be structured and funded into the future. **[Kirk Young, USFWS]** Progress has been made on native fish such as humpback chub and they may not have ever looked so good in the lower basin. A lot of that could quickly unwind. We should

not become complacent especially with native fish if warm water from Lake Powell could change this probably very quickly. **[Larry Stevens, GCWC]** The GCDAMP is regarded as the best example of adaptive management in the world based on high quality science. It is great example of providing transparent management of a very complicated system. The same issues come up repeatedly, such as funding, and policy issues on endangered species. To address this, GCDAMP developed an Administrative History project to document these perennial questions. About a decade ago, the first step was completed that established future desired conditions of the river corridor for power, biological resources, sediment, etc. **[Kelly Burke, GCWC]** Perhaps expand on input from the public during these meetings. The non-governmental organizations (NGOs) are cognizant of the program's constituencies. Recommends looking at getting more public participation to make the group's work more transparent. **[John Hamill, FFI/TU]** This program is an example of how collaboration works but it works best when there is strong leadership and involvement at the Secretary's Designee level.

2021 GCDAMP Annual Reporting Meeting Update – Part 3: Mark Wimer, Acting Chief, Grand Canyon Monitoring and Research Center

[\[PRESENTATION - Modeling to support Adaptive Management\]](#) **[Charles Yackulic, GCMRC]** The central role of scientists is prediction, and through data collection, to reduce uncertainty. This presentation addresses six parts of the LTEMP model framework. For vegetation, the modeling focus was on certain groups and the changes between these groups. Improvements have come from redesigning the monitoring program to make it more systematic and intensive. Humpback chub/trout modeling work involved keeping track of different size classes of fish with many simulations to test hypotheses and understand uncertainty. New modeling includes updating the parameters based on increased knowledge of the species and other conditions such as phosphorous. Improvements of non-native modeling included updates of water temperature under different storage levels and spawning suitability of species based on temperature conditions. The next step is to bring an understanding of this to population dynamics. **[Lucas Bair, GCMRC]** In the LTEMP EIS, the sand routing model compared inputs and outputs into three river reaches to assess beach building potential. It is also used by Reclamation to determine HFEs. The model was recalibrated in 2019 to use more recent data. There is a new sandbar model that will be available soon that predicts sandbar change based on deposition from eddies and erosion. Based on this, it is predicted that fewer HFEs reduces sandbar size. This model is currently under review and will be available for scenarios at the end of 2021. The recreation metrics have been updated with improved methods. The benefits are that they: 1) bundle certain attributes and 2) are additive so they can be compared across recreational groups or with other resource changes. There were three main power system analysis models. One advancement is a screening tool that is being development to assess alternatives more quickly and efficiently.

Q&A and discussion

[John Hamill, FFI/TU] Is there a model that could help determine how much should be paid to increase angler participation in the incentivized harvest program? **[Lucas Bair, GCMRC]** One does not exist, but a model could be developed to estimate what the program should pay to increase participation. Based on discussions with NPS, there is a push to increase that payment, which will increase participation. **[Larry Stevens, GCWC]** The AMWG requested this comparison with the models to better understand our progress. What we do not have is where we want to get to with the desired future conditions, and how we document that progress. Would like to establish goal posts on where we want to be at the end of

this process. **[Lucas Bair, GCMRC]** Having solid metrics and objectives and identifying critical uncertainties are important to Larry's point in knowing where to go with this program.

[\[PRESENTATION - Place, Time and Consciousness in the GCDAMP\]](#) **[Kurt Dongoske, Pueblo of Zuni]** Over the past ten years, the Annual Reporting Meetings are characterized by scientific monitoring and research presented in quantitative and detached terms. There have been few reports that include humanistic sentiments or values associated with natural resources. There are five tribes that know and live in the Grand Canyon that are part of their natural landscape since time immemorial. Their respect of the knowledge of the Colorado River ecosystem is little acknowledged. What are the moral and ethical responsibilities of scientists and land managers to these communities? When Native Americans are disassociated from Place it can cause soul death. Time connects people to Place. Consciousness includes knowing when plants, animals, rivers, and mountains are being treated well or poorly. The tribes are disenfranchised when this program does not consider non-Western perspectives. Highlights of presentations made during the Annual Reporting Meeting were provided on how collaborative management that incorporates humanist sentiments can occur.

Q&A and discussion

[Larry Stevens, GCWC] Are there ways to facilitate more active discussions with the tribes that could be accomplished within the next year or next TWP? **[Kurt Dongoske, Pueblo of Zuni]** There needs to be a willingness by the scientific establishment to look at Tribal Knowledge in a commensurate fashion. Western Science does not need to conflict with Tribal Knowledge and can be complementary. We need to develop a receptiveness within GCMRC to utilize this knowledge to benefit the program. It can enhance how we deal with the environment. If you were to think of all the resources being conscious, would you treat them differently? It would fundamentally alter how one interacts with the ecosystem. **[Kelly Burke, GCWC]** Could this be turned into an action for an Ad Hoc group? **[Kurt Dongoske, Pueblo of Zuni]** GCMRC and Reclamation would need to keep these concepts moving forward. It could be done through Reclamation's cultural sensitivity training that will be developed and for GCMRC to place more emphasis on qualitative ways to understand the ecosystem. **[Larry Stevens, GCWC]** Will those presentations from the meeting be published? **[Kurt Dongoske, Pueblo of Zuni]** The presenters are discussing this, but nothing has been finalized yet. **[Peter Bungart, Hualapai]** It appears a lot of management actions taken fall under the domains of the ESA, Grand Canyon Protection Act, etc., but not enough of the focus is on the broader picture. For example, bug flows, which has much broader ecological implications to the system that should be explored. There is not a lot of acknowledgement of these other benefits. Natural resources are also cultural resources.

Technical Work Group Chair Report: Seth Shanahan, Technical Work Group Chair

[\[PRESENTATION\]](#) **[Seth Shanahan, Southern Nevada Water Authority (SNWA) and TWG Chair]** The next TWG meeting is April 13-14, which is expected to be virtual. The addition of DO and temperature in the basin hydrology presentations are important for the TWG to hear and to have time to plan for. Craig Ellsworth put together a panel for the next meeting to consider the upcoming 7.48 maf release year. Conversations are now occurring on the Tier 1 conservation triggers related to humpback chub. It has also been five years since these triggers were reviewed. One topic that will involve more assessment is related to native fish in the Western Grand Canyon and the barrier to non-natives at Pearce Ferry Rapid. Progress for monitoring metrics is needed. Mike Runge in the decision analysis support work for LTEMP has already described the monitoring metrics. This gives us a way to understand various potential

actions that the AMWG might want to advise the Secretary to take. The metrics need to be in place in a robust adaptive management cycle to help relate to the modeling. The TWG has also heard concerns about when there is enough information to try something new or different. The strong workflow foundation of the TWG can help bring these issues forward. A fond farewell was expressed to Vineetha Kartha who has been a great partner to Seth and to the TWG.

Tribal Representatives Report

[Wayne Pullan, AMWG Chair] The question was asked earlier about what the new Administration should know. Would now like to revise that to ask what should Congresswoman Haaland know on her first day? Also interested in hearing about any work for FY2021.

[Jakob Maase, Hopi] The Grand Canyon has immense religious and tribal significance. The Hopi have a covenant to be stewards of this land. Because of the reservation, it is hard to send people to be involved and other logistic issues such as monetary, communication technology, and time. The tribe was not able to do a river monitoring trip last year but trying again this September. Funds have also been allocated for an ethnographic project to interview elders about the Grand Canyon, which has not been done in 20 years. Also hoping to do a compilation of older reports on where the tribe is going because Jakob and Stewart are both new to the AMWG. Need to look at the projects holistically and how the resources connect. The tribes do not make a split between natural and cultural resources. Tribes often get lumped together but they have different opinions.

[Peter Bungart, Hualapai] The tribes are excited about upcoming confirmation of Deb Haaland to become Secretary of Interior. It is refreshing to have someone from the West and an Indigenous person who understands the issues of importance to the tribes. One thing about Kurt's presentation regarding people from the Amazon basin and Australia, their experiences are mirrored here, as well. There are holistic ways to looking at the landscape but also risks such as when visiting ancestral sites. These issues have been raised over the years, but it is now being brought into greater focus. Visitors to the river need to understand that they are visiting the tribes' ancestors.

[Richard Begay, Navajo Nation] The Navajo have not had much activity in 2020 because of the shutdowns so not much to report. This just started up again on Monday. A new person has been hired who will start participating in these meetings and other activities.

[Daniel Bullets, SPC] The SPC is also excited about the new Secretary of the Interior. A river trip is scheduled for June that will introduce new tribal monitors and agency participation. SPC requests to be consulted on all issues related to the Grand Canyon.

Q&A and discussion

[Larry Stevens, GCWC] Would the new Secretary entertain a river trip with the tribes to discuss these matters? **[Wayne Pullan, AMWG Chair]** Will take that forward and hope the tribes will extend that invitation, as well.

[Review of the 2007 Interim Guidelines \(7.D. Review\): Carly Jerla, Civil Engineer and Malcolm Wilson, Water Resources and Compliance Group Chief, Bureau of Reclamation](#)

[\[PRESENTATION\]](#) **[Malcolm Wilson, Reclamation]** This presentation is to give a high-level review of the process for the [7.D Review](#). The Basin States created a drought mitigation plan to address operations

during low reservoir conditions. The Interim Guidelines (Guidelines) were adopted in 2007. Section X1.G.7.D. (“7.D.”) of the Guidelines describes the process to review the effectiveness of the Guidelines. This work began in early 2020. The review and report were enhanced by working with Basin partners. Since this review was retrospective of the guidelines, it did not consider future activities or complementary activities. **[Carly Jerla, Reclamation]** The process formerly started in March 2020 and included opportunities for stakeholder input as well as additional meetings and two comment periods. Comments have been posted on the website (link above) along with the report. The Appendix to the report contains a wealth of information. The Appendix compares the projections with what occurred. Having objective criteria in the guidelines improved management actions. The structure of the guidelines around lake elevations led to improved predictability and a common framework to assess risk, but additional operational flexibility was needed. This is going to be an important consideration going forward. Closer coordination between Upper and Lower basins is needed as one affects the other. Due to the prolonged drought, we found that these coordinated operations combined with lower basin volumes were not sufficient to get the risk down to a level that the basin was comfortable with and additional actions were needed, which undermined some of the objectives.

Q&A and discussion

[Matt Rice, American Rivers] What is the process for this group to include Grand Canyon priorities and when can we get going on that? **[Carly Jerla, Reclamation]** Reclamation does not have a process in place and has not made decisions on timing to renegotiate the operating criteria. There are a lot of planning considerations to work through. Understanding the operational impacts to these resources is critical whether that be through the modeling or knowledge of hydrology. **[John Hamill, FFI/TU]** How will the impact of the guidelines on cultural, recreational, and natural resources be considered in the review? **[Malcolm Wilson, Reclamation]** The review has been completed and it included those resources.

Potential Water Year 2021 Experiments: Lee Traynham, Bureau of Reclamation; Mark Wimer and Ted Kennedy, Grand Canyon Monitoring and Research Center

[PRESENTATION] **[Lee Traynham, Reclamation]** Provided an overview of the LTEMP process for implementing experiments. For the fall period, no HFE occurred because of sediment. Although this is currently the sediment accounting window for a spring HFE, this is not likely to be triggered for 2021. The spring disturbance flow hydrograph was approved last week. The March timeframe allows comparison of this flow with past experiments, it avoids motor recreation season that starts in April, and helps minimize impacts to hydropower resources. The spring disturbance monitoring is proposed for support under the Experimental Management Fund; however, the timing for Element O.7 has passed and will not be done, and a decision has not been made yet on Element O.11. **[Ted Kennedy, GCMRC]** There is interest in a spring disturbance is because of the possibility for more naturally timed flows that could benefit native fish. In spite of not being able to do Element O.7, it is believed this can still be used to determine if the flow disturbance affects native fish movement. The knowledge assessment process did not find any major red flags although short-term impacts are expected such as to navigation, recreation, hydropower, and native fish. Overall, there were more upsides than downsides. One resource benefit is that the spring disturbance flow may disfavor brown trout because it could adversely affect their spawning success. Another benefit is that it could decrease the food base for brown trout. The spring flow may benefit recreation, which was noted in the Boatmen’s Quarterly Review (Winter 2021). **[Joel Sankey, GCMRC]** Another data acquisition effort that is planned during May is the Remote

Sensing Overflight. This is not an experiment, but requires a steady, 8,000 CFS flow to maximize data quality. **[Lee Traynham, Reclamation]** The Planning and Implementation Team will begin deliberations on Bug Flows next week to consider it for FY2021.

Q&A and discussion

[Leslie James, CREDA] What is the maximum amount of time that could be required due to weather (over the 8 days planned for the overflight)? Is there a hydropower cost estimate available yet? **[Joel Sankey, GCMRC]** The thinking is that the low flow would start on that Friday evening (May 28, 2021) and that would provide the contractor eight days to acquire the data. The backup plan is to extend that for two more days. The contractor kick-off meeting will happen tomorrow. **[Shane Capron, WAPA]** WAPA has not completed the cost assessment for the overflight yet but will be working on that soon. For reference, the 2013 overflight cost \$74,000.

[Larry Stevens, GCWC] For the past 15 years, HFEs have occurred in November, which is an unnatural time for floods. A springtime experiment is important to learn about physical and biological responses. The process itself was also important to go through for when there are sediment triggers for a spring HFE.

Public Comment

None.

WRAP-UP: Wayne Pullan, Acting Secretary's Designee to the Adaptive Management Work Group

[Wayne Pullan, AMWG Chair] Thanks to everyone involved in this two-day meeting, to Mike for keeping us on time, and to Lee and Tara for making everything possible. Heard two action items to: 1) provide a detailed discussion about GCDAMP funding and 2) extend an invitation to the new Secretary to be involved in a river trip with tribal representatives and other stakeholders. A couple of other messages were also heard: 1) Be aware of the desired future conditions and keep them in mind, 2) Consider an increase in public engagement, and 3) Encourage strong leadership from the Secretary's Designee.

Next AMWG meeting dates:

- May 19, 2021 (webinar)
- August 18-19, 2021
- January 11-13, 2022 (Annual Reporting and TWG Meetings)

Meeting adjourned at: 3:13 PST

AMWG Members, Alternates, and Leadership

Todd Adams, Utah
Jan Balsom, NPS-GRCA
Cliff Barrett, UMPA (Alternate)
Richard Begay, Navajo Nation
David Brown, GCRG
Peter Bungart, Hualapai Tribe
Kathleen Callister, Reclamation (Alternate)
Chris Cantrell, AZGFD
Charlie Ferrantelli, State of Wyoming (Alternate)
Kevin Garlick, UMPA
Michelle Garrison, State of Colorado (Alternate)
John Hamill, FFI/TU (Alternate)
Paul Harms, State of New Mexico (Alternate)
Jeff Humphrey, USFWS
Leslie James, CREDA

John Jordan, FFI/Trout Unlimited
Arden Kucate, Pueblo of Zuni
Charles "Chip" Lewis, BIA
Jakob Maase, Hopi Tribe
John McClow, State of Colorado
Jessica Neuwerth, CRBC
Daniel Picard, Reclamation, Acting DFO
Wayne Pullan, Acting Secretary's Designee
Matt Rice, American Rivers
Peggy Roefer, CRCN (Alternate)
Brian Sadler, WAPA (Alternate)
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Alex Pivarnik
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John Swett
Lee Traynham
Nathan Watson
Chris Watt
Nicholas Williams
Malcolm Wilson

Interested Persons

Terra Alpaugh, Kearns & West
Rob Billerbeck, NPS
John Bowie, Kearns & West
David Braun, Sound Science
Daniel Bullets, Southern Paiute Consortium
Kevin Bullets, Southern Paiute Consortium
Kelly Burke, Grand Canyon Wildlands Council
Shane Capron, WAPA
Julie Carter, AZGFD
Tom Chart, USFWS
Kevin Dahl, NPCA
Martina Dawley, Hualapai Tribe
Kurt Dongoske, Pueblo of Zuni
Sinjin Eberle, American Rivers
Alicyn Gitlin, Sierra Club
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Brian Healy, NPS
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Shana Rapoport, CRBC
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Seth Shanahan, TWG Chair and SNWA
Robert Schelly, NPS
Erik Skeie, State of Colorado
Rod Smith, DOI
Jim Stroger, FFI/TU
Melissa Trammell, NPS
Tim Vigil, WAPA
Kirk Young, USFWS

Abbreviations

AMWG – Adaptive Management Work Group
AZDWR – Arizona Department of Water Resources
AZGFD – Arizona Game and Fish Department
BIA – Bureau of Indian Affairs
BO – Biological Opinion [or BiOp]
CAISO – California Independent System Operator
CFS – cubic feet per second
CRBC – Colorado River Board of California
CRCN – Colorado River Commission of Nevada
CREDA – Colorado River Energy Distributors Association
CRSP – Colorado River Storage Project
DO – dissolved oxygen
DOI – Department of the Interior
EIS – Environmental Impact Statement
E.O. – Executive Order
ESA – Endangered Species Act
FFI – Fly Fishers International

maf – million acre-feet
MDT – Mountain Daylight Time
MSCP – Multi Species Conservation Program
NEPA – National Environmental Policy Act
NGO – Non-Governmental Organization
NHPA – National Historic Preservation Act
NPCA – National Parks Conservation Association
NPS – National Park Service
PST – Pacific Standard Time
Reclamation – Bureau of Reclamation
ROD – Record of Decision
SBSC – Southwest Biological Science Center
Secretary – Secretary of the Interior
SNWA – Southern Nevada Water Authority
S.O. – Secretarial Order
SPC – Southern Paiute Consortium
SRP – Soluble Reactive Phosphorus

FY – Fiscal Year (October 1 – September 30)
GCDAMP – Glen Canyon Dam Adaptive Management Program
GCMRC – Grand Canyon Monitoring & Research Center
GCNP – Grand Canyon National Park
GCRG – Grand Canyon River Guides
GCWC—Grand Canyon Wildlands Council
GLCA – Glen Canyon National Recreation Area
GPP – gross primary productivity
GRCA – Grand Canyon National Park
HFE – High Flow Experiment
LTEMP – Long-Term Experimental and Management Plan

TMF – Trout Management Flows
TU – Trout Unlimited
TWG – GCDAMP Technical Work Group
TWP – Triennial Budget and Work Plan
UCRC – Upper Colorado River Commission
UMPA – Utah Municipal Power Agency
USFWS – United States Fish & Wildlife Service
USGS – United States Geological Survey
WAPA – Western Area Power Administration
WY – Water Year