

Glen Canyon Dam Technical Work Group Meeting
January 26, 2017

Summary of Actions Taken

1. Draft Minutes for October 18-19, 2016, meeting were approved by consensus.

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**Date:** January 26, 2017

**Start Time:** 8:15 a.m.

**Conducting:** Seth Shanahan, TWG Chair  
Vineetha Kartha, TWG Vice-Chair

[Attendees](#)

**Meeting Recorder:** Linda Whetton

**Welcome and Administrative:** Mr. Shanahan welcomed the members and the public.

- Introductions were made and a quorum determined.
- Approval of June October 18-19, 2016, Meeting Minutes. Motion approved by consensus.
- [Review of Action Items.](#)
- Introduction of New Deputy Chief for GCMRC. Mr. Michael Moran started working for GCMRC in November 2016 as the deputy chief. He previously worked at the USGS Nevada Water Science Center for 10 years and prior to that was in South Dakota with the USGS National Water Quality Assessments Program.
- Next Meeting Date: April 20-21, 2017. Location will be ADWR in downtown Phoenix.
- Ad Hoc Group List Updates. The following were provided:
  - Trout AHG (TAHG) – Mr. Budwig. The FFF/TU group met with GCMRC's scientists to discuss what's been accomplished and ensure their priorities are in sync. They produced a document which was sent to the TAHG for comments. Consensus on that hasn't been reached so a conference call will be scheduled.
  - Socioeconomics AHG (SEAHG) – Mr. Reeder. The SEAHG doesn't have consensus on working through the priorities based in Table 1 and will hold a conference call in early February to discuss further.
  - Cultural Resources AHG (CRAHG) – Mr. Dongoske. A list of ten potential projects focusing on Native American concerns was generated and sent to the CRAHG for comments. Very few responses were received, a list of projects was provided to Mr. Shanahan.
  - Administrative History AHG (AHAHG) – Mr. Stevens. Dr. Paul Hirt (ASU) is developing a plan for conducting interviews and interacting with past AMP members and will report at the next AMWG meeting.
- Science Advisors Program Update. Dr. David Braun. The Fisheries PEP was wrapped up and they're working with GCMRC to shepherd the final report to completion. In supporting the Knowledge Assessment work, there are clear needs for attention to many things including how antecedent conditions affect outcomes of management actions, how external drivers affect resource conditions and outcomes of management actions, etc. He reviewed tasks for the remainder of FY17.
- Update on Plan for Controlling High Risk Aquatic Invasive Fish Species – Mr. Ken Hyde. A very successful ammonia treatment was conducted last October resulting in capturing nearly 5,000 to 6000 fish through electrofishing in the upper slough. There were very few GSF in the lower slough so no treatment occurred there. There was reproduction occurring in the upper slough because the remaining fish were less than two inches in length. A series of photos of the slough were taken during the November, 2016 HFE. The HFE scoured the upper slough. Research and field trips have been conducted to monitor the slough and to develop options for dealing with GSF. NPS will be proposing a much more extensive monitoring system for non-natives, especially in the low backwater areas in the Lees Ferry Reach. This will include the electrofishing that AZGFD conducts. The new plan will also include best management practices that weren't fully fleshed out in the current CFMP. A research trial will be done this spring to install a couple of exclusionary screens in an attempt to keep GSF from getting to the upper slough. AZGFD is considering releasing triploid (sterile) rainbow trout to augment the population.
- Update on High Flow Experiment Reporting – Ms. Katrina Grantz. Reclamation is preparing a report that will include the reporting requirements from past HFE events.

[Review of the 2017 Annual Reporting Meeting \(ARM\) and Discussion of Knowledge Assessment](#) – Mr. Seth Shanahan. The TWG was asked to share comments and concerns from the past 2-day ARM. The following were captured:

- *The Yard/Korman paper stating that rather than electrofishing (CPUE) which provides imprecise indices of recruitment and abundance, utilize mark-recapture by tagging fish. Trout and bug flows will need results quickly to determine an impact on chub, trout, and the whole ecosystem. How do we get to the point where that methodology is changed? Who has that discussion? Where do we go from here?*
  - *Mr. Shanahan – There's time lag in getting the information. When we see work products come out, we need to try to identify if changes are needed.*
  - *Mr. VanderKooi – We are thinking in terms of the TWP and the LTEMP. We've had debates on a number of things and how best to go forward. We need to look at what the information needs are that support LTEMP and put forth proposals that are the best approaches based on all these pieces of information and data we've had in the past, published papers, etc. We're going to have some challenging discussions.*
- *People wanting to be involved in the budget process should sign up to work on the BAHG. Members are encouraged to consider how their issues relate to the Information Needs.*
- *Data collection is very important but let's make sure we don't lose the value of past data collected. Need to see more emphasis on how dam operations affect data and canyon work in general.*
- *The Zuni religious leaders believe the taking of life in the canyon is having a negative effect at Zuni by the loss of life by Zunis. Zunis are dying. Zuni concerns haven't been addressed directly. In doing mechanical removal, you are disproportionately affecting a community of people. This program has an ethical responsibility to address the Zuni concerns.*
- *How do we get the nutrients dynamics model of the system that actually serves the purposes of informing us to pay more attention and be able to make predictions? There is a lot of information about reservoir productivity but not so much about the connection between reservoirs and downstream rivers. Springtime HFEs are controversial. This is a 3-year budget cycle, but it would be important to discuss the advantages and disadvantages of spring HFEs and consider them in the third year of the budget.*

[Discussion of Knowledge Assessment](#) – Mr. Seth Shanahan. The Knowledge Assessment, was prepared using the Park Service's NRCA (Natural Resource Condition Assessments) method. A western science knowledge assessment component as well as a tribal knowledge assessment component were originally intended. The tribes will discuss and provide input on what is the most appropriate way to consider tribal knowledge. The western science component is ongoing and the topics being evaluated were presented. This should help future budget discussions by determining where the gaps are and by establishing priorities.

Dr. David Braun explained the symbols being used are to enable a quick understanding of the current status of resources conditions and trends. The January 11 deadline was a very aggressive schedule and couldn't be met, the new deadline is February 15. The goal is to have a final work product by mid-March so that the process can move forward and aid in BAHG formulations.

[Update on the LTEMP ROD](#) – Ms. Katrina Grantz. The LTEMP ROD was signed on Dec. 15, 2016 and the Preferred Alternative identified in the LTEMP EIS was selected without modification. In terms of environmental commitments, the document states that the GCDAMP, GCMRC, AMWG, TWG, and the SA are going to continue. The goals and objectives of the LTEMP are the objectives of the GCDAMP and will fold in as they work on the TWP. The priorities identified in the ROD include experimental and management actions, mitigation, environmental commitments, and research and monitoring. It further states that the GCDAMP activities eligible for funding from power revenues are those actions related to dam operations or the mitigation of dam operations within the Colorado River Ecosystem (CRE). Beginning January 1, 2017, interim operations shall implement the LTEMP general monthly release volume pattern. The LTEMP ramp rates and daily fluctuations shall be phased in no later than October 1, 2017, Spring HFEs shall be implemented when conditions warrant, as described in the FEIS beginning September 30, 2019. Research and monitoring projects already approved in the 2015-2017 triennial work plan and budget shall continue until September 30, 2017 (Spring 2020).

[Basin Hydrology, Operations and 2018 Hydrograph](#) – Mr. Paul Davidson. As of today, the snow water equivalent is 167% of median with 97% of average total season accumulation. Basin reservoir storage totals range from 47% full at Lake Powell to 83% full at Flaming Gorge. The April to July forecasted inflow for Lake Powell ranges from 6,500 KAF (91% of average) to 9,000 KAF (126%). The Lake Powell operating tier was set in August 2016 at a 8.23 maf annual release and using the April 24-monthly study projections there may be an April adjustment to balancing releases of 9.0 maf. All three forecasts scenarios project a 9.0 maf release from Lake Powell in water year 2017. Monthly release volumes under LTEMP will be adjusted according to the annual GCD operations and the projected annual release volume (the annual release does not change as a result of LTEMP). There will be only five hydropower units available in February and March which affects WAPA's capacity to market power. It will also affect (reduce slightly) some monthly releases. Within water year 2017 and ending calendar year 2017, the projections show Lake Powell within the upper elevation balancing tier ranging from 3,577 to 3,638 feet.

For WY 2018 there will be three hydropower units out for maintenance reasons in Dec-Feb. During the possible HFE window in early November 2017 it is anticipated that seven units will be available. However, later in November, units 5 and 6 will be out, leaving only 6 hydropower units available. Based on current Maximum probable, most probable and minimum probable inflow forecasts, the maximum annual release for water year 2018 is projected to be 12.1 maf (with an April adjustment to equalization), the most is 9.0 maf and the minimum is 8.8 maf release.

[As Requested by AMWG, Review the FY17 Budget ...](#) – Mr. Seth Shanahan. The AMWG passed the following motion in August 2016: “. . . AMWG also requests TWG to review the FY17 budget after issuance of the LTEMP ROD, to determine if budget or work plan changes may be needed as a result of the ROD.” He provided a brief history of guiding factors; The Secretary has already made her opinions known on what advice she wanted from this group, but felt the TWG should discuss FY18 activities that might need to be considered within the context of FY17 in order to plan correctly. The following comments were captured.

- Scouring impacts of HFEs. If there is intent to do a Nov 2017 HFE, then determine what scouring information is needed –and the recovery period of the foodbase?
- Unexpended funds could assist with advance planning for potential HFE events.
- One experiment that hasn't been considered in the Fall is the extended duration HFE (up to 192 hours) which could occur this calendar year. Are there any pre-planning or additional monitoring considerations on how best to monitor this? Are we getting deposition for the entire time period and what does it look like? Consider having a slower down ramping rate in order to measure and study the results of a possibly lower sloping beach. Hualapai has suffered from HFEs in the past and would hope this is factored into the budget for mitigation of impacts.
- Try to prevent the continuous inflow of GSF into the system. We may get larval grass carp in the system.

[Review of Funding Guidance and Other Guidance for the GCDAMP](#) – Mr. Rod Smith. Understanding the funding for this program is a complicated process. If anyone seeks funding for a project, they need to be prepared to explain the desired project and articulate how the desired project is consistent with the funding authority. Those authorities include the Basin Fund, GCPA Sections 1804(e) and 1805, Public Law 106-377 and AMP-related documents.

[Discuss Upcoming Budget and Conduct Group Exercise](#) – Mr. Seth Shanahan provided instructions for the group exercise with the goal of providing budget guidance to Reclamation and GCMRC. He reviewed the target dates for completing various tasks to ensure a budget recommendation at the June 2017 meeting. The following budget sideboards would be used:

- FY17 Budget: \$10.92 (BOR: \$2.11M, GCMRC: \$8.80M)
  - FY17 CPI is 1.5%
- CPI Assumptions: Assume 1% CPI for each year (2018, 2019, 2020)
- Assume roughly 20% for BOR (program administration), 80% for GCMRC (research and monitoring)

Following the 90-minute exercise, Mr. Shanahan shared the results.



[Brown Trout Management Considerations: An Update](#) – Mr. Brian Healy. Brown trout (BT) were stocked in Bright Angel Creek in the 1930's and expanded in distribution post-dam. For more than 20 years they've been recognized as a threat to native fish. In 2003, the TWG formed a non-native control ad hoc group to determine feasible methods to control non-native species and protect humpback chub. A history of the management actions that have been utilized was provided. NPS is going to implement a pilot Sonic-Telemetry study to learn more about BT in Lees Ferry with a focus on determining their diurnal/nocturnal habitat use and will use tagged fish to find locations of spawning aggregations to target future mechanical removal. The work will begin February 1-3, 2017.

**Public Comment:** Mr. Chris Watt. The GCD Visitor's Center has been remodeled and a grand opening is scheduled in March. More information to follow.

**Adjourned:** 3:20 p.m.

Respectfully submitted,

Linda Whetton  
Upper Colorado Region  
Bureau of Reclamation

**Upcoming Meetings:**

- DOIFF Feb 14, 2017
- AMWG Feb 15-16, 2017
- TWG Mtg Apr 20-21, 2017**
- AMWG Webinar May 24, 2017
- TWG Mtg Jun 13-14, 2017**
- DOIFF Aug 22, 2017
- AMWG Aug 23-24, 2017

## Key to Glen Canyon Dam Adaptive Management Program Acronyms

|                                                   |                                                                     |
|---------------------------------------------------|---------------------------------------------------------------------|
| ADWR – Arizona Dept. of Water Resources           | HFE – High Flow Experiment                                          |
| AF – Acre Feet                                    | HMF – Habitat Maintenance Flow                                      |
| AGFD – Arizona Game and Fish Department           | HPP – Historic Preservation Plan                                    |
| AIF – Agenda Information Form                     | IG – Interim Guidelines                                             |
| AMP – Adaptive Management Program                 | INs – Information Needs                                             |
| AMWG – Adaptive Management Work Group             | KA – Knowledge Assessment (workshop)                                |
| AOP – Annual Operating Plan                       | KAS – Kanab Ambersnail (endangered native snail)                    |
| ARM – Annual Reporting Meeting                    | LCR – Little Colorado River                                         |
| ASMR – Age-Structure Mark Recapture               | LCRMCP – Lower Colorado River Multi-Species<br>Conservation Program |
| BA – Biological Assessment                        | LTEMP – Long-Term Experimental and Management Plan                  |
| BAHG – Budget Ad Hoc Group                        | LTEP – Long Term Experimental Plan                                  |
| BCOM – Biological Conservation Measure            | MAF – Million Acre Feet                                             |
| BE – Biological Evaluation                        | MA – Management Action                                              |
| BHBF – Beach/Habitat-Building Flow                | MATA – Multi-Attribute Trade-Off Analysis                           |
| BHMF – Beach/Habitat Maintenance Flow             | MLFF – Modified Low Fluctuating Flow                                |
| BIA – Bureau of Indian Affairs                    | MO – Management Objective                                           |
| BO – Biological Opinion                           | MRP – Monitoring and Research Plan                                  |
| BOR – Bureau of Reclamation                       | NAU – Northern Arizona University (Flagstaff, AZ)                   |
| BWP – Budget and Work Plan                        | NEPA – National Environmental Policy Act                            |
| BT – Brown Trout                                  | NHPA – National Historic Preservation Act                           |
| CAHG – Charter Ad Hoc Group                       | NNFC – Non-native Fish Control                                      |
| CAP – Central Arizona Project                     | NOI – Notice of Intent                                              |
| GCT – Grand Canyon Trust                          | NPCA – National Parks Conservation Association                      |
| CESU – Cooperative Ecosystems Studies Unit        | NPS – National Park Service                                         |
| cfs – cubic feet per second                       | NRC – National Research Council                                     |
| CFMP – Comprehensive Fisheries Management Plan    | O&M – Operations & Maintenance (Reclamation Funding)                |
| CMINS – Core Monitoring Information Needs         | PA – Programmatic Agreement                                         |
| CMP – Core Monitoring Plan                        | PBR – Paria to Badger Creek Reach                                   |
| CPI – Consumer Price Index                        | PEP – Protocol Evaluation Panel                                     |
| CRBC – Colorado River Board of California         | POAHG – Public Outreach Ad Hoc Group                                |
| CRAHG – Cultural Resources Ad Hoc Group           | Powerplant Capacity = 31,000 cfs                                    |
| CRCN – Colorado River Commission of Nevada        | R&D – Research and Development                                      |
| CRE – Colorado River Ecosystem                    | RBT – Rainbow Trout                                                 |
| CREDA – Colorado River Energy Distributors Assn.  | RFP – Request for Proposal                                          |
| CRSP – Colorado River Storage Project             | RINs – Research Information Needs                                   |
| CWCB – Colorado Water Conservation Board          | ROD Flows – Record of Decision Flows                                |
| DAHG – Desired Future Conditions Ad Hoc Group     | RPA – Reasonable and Prudent Alternative                            |
| DASA – Data Acquisition, Storage, and Analysis    | SA – Science Advisors                                               |
| DBMS – Data Base Management System                | SAEC – Science Advisors – Executive Coordinator                     |
| DOE – Department of Energy                        | Secretary – Secretary of the Interior                               |
| DOI – Department of the Interior                  | SCORE – State of the Colorado River Ecosystem                       |
| DOIFF – Department of the Interior Federal Family | SHPO – State Historic Preservation Office                           |
| EA – Environmental Assessment                     | SOW – Statement of Work                                             |
| EIS – Environmental Impact Statement              | SPAHG – Strategic Plan Ad Hoc Group                                 |
| ESA – Endangered Species Act                      | SPG – Science Planning Group                                        |
| FACA – Federal Advisory Committee Act             | SSQs – Strategic Science Questions                                  |
| FEIS – Final Environmental Impact Statement       | SWCA – Steven W. Carothers Associates                               |
| FRN – Federal Register Notice                     | TCD – Temperature Control Device                                    |
| FWS – United States Fish & Wildlife Service       | TCP – Traditional Cultural Property                                 |
| FY – Fiscal Year (October 1 – September 30)       | TEK – Traditional Ecological Knowledge                              |
| GCD – Glen Canyon Dam                             | TES – Threatened and Endangered Species                             |
| GCES – Glen Canyon Environmental Studies          | TMC – Taxa of Management Concern                                    |
| GCT – Grand Canyon Trust                          | TMF – Trout Management Flows                                        |
| GCMRC – Grand Canyon Monitoring & Research Center | TWG – Technical Work Group                                          |
| GCNP – Grand Canyon National Park                 | UCRC – Upper Colorado River Commission                              |
| GCNRA – Glen Canyon Nat'l Recreation Area         | UDWR – Utah Division of Water Resources                             |
| GCPA – Grand Canyon Protection Act                | USBR – United States Bureau of Reclamation                          |
| GLCA – Glen Canyon Nat'l Recreation Area          | USFWS – United States Fish & Wildlife Service                       |
| GRCA – Grand Canyon National Park                 | USGS – United States Geological Survey                              |
| GCRG – Grand Canyon River Guides                  | WAPA – Western Area Power Administration                            |
| GCWC – Grand Canyon Wildlands Council             | WY – Water Year                                                     |
| GSF – Green Sunfish                               |                                                                     |
| HBC – Humpback Chub (endangered native fish)      |                                                                     |