

**Glen Canyon Dam Adaptive Management Work Group Meeting
August 24-25, 2016**

Summary of Actions Taken

The AMWG reached consensus on the following actions during this meeting:

- AMWG approves the minutes of May 25, 2016, meeting.
- Motion proposed by Mr. Harris, seconded by Mr. Nimkin: AMWG recommends to the Secretary of the Interior her approval of the GCDAMP FY17 budget as described in the two tables (attached to the Agenda Item Form) from the Bureau of Reclamation and the Grand Canyon Monitoring and Research Center. 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. AMWG acknowledges that tribal representatives will work with the Bureau of Reclamation on the implementation of its budget items D.2.5 through D.2.8.
- Motion proposed by Mr. Wolff, seconded by Mr. Harris: AMWG recommends to the Secretary of the Interior for her approval the following Water Year 2017 Hydrograph for Glen Canyon Dam. Annual Release Volumes will be determined by the 2007 Interim Guidelines and shall be reviewed and adopted through the normal annual operating plan process (in consultation with the Basin States as appropriate). Monthly Release Volumes are anticipated to shift depending upon: (1) the projected Annual Release Volume, (2) power plant capacity, and (3) the magnitude of a potential High Flow Experiment. Monthly Release Volumes may vary within the targets identified below. Any remaining monthly operational flexibility will be used for existing power production operations under the Modified Low Fluctuating Flow (MLFF) alternative selected by the 1996 ROD and contained in the 1995 FEIS and in compliance with all applicable NEPA compliance documents (HFE EA, NNFC EA, 2007 Interim Guidelines). Monthly release volumes proposed in this hydrograph will not affect operating tier determinations for Lakes Powell and Mead under the 2007 Interim Guidelines.
Release objective for June is:
 - 600 to 650 kaf for annual releases below 9.0 maf
 - 800 kaf for annual releases of 9.0 maf to less than 9.5 maf
 - 900 kaf for annual releases of 9.5 maf to less than 10 maf
 - Greater than 900 kaf for annual releases 10 maf and greaterRelease objective for August is:
 - 800 kaf for annual release below 9.0 maf
 - 900 kaf for annual releases of 9.0 maf to less than 10 maf
 - Greater than 900 kaf for annual releases 10 maf and greaterRelease objective for September is:
 - 600 kaf for annual releases below 9.0 maf
 - 700 kaf for annual releases of 9.0 maf to less than 10.0 maf
 - 800 kaf or greater for annual releases of 10.0 maf or greater; up to power plant capacity for high equalization releasesMonthly Release Volumes will generally strive to maintain 600 kaf levels in the shoulder months (spring and fall) and 800 kaf in the December/January and July/August timeframe.

Additionally, the Bureau of Reclamation will continue to apply best professional judgment in conducting actual operations and in response to changing conditions throughout the water year. Such efforts will continue to be undertaken in coordination with the DOI/DOE agencies and in consultation with the Basin States as appropriate, to consider changing conditions and adjust projected operations in a manner consistent with the objectives of these parameters as stated above and pursuant to the Law of the River.

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**August 24, 2016**

**Start Time:** 9:45 a.m.

**Conducting:** Brent Rhees, Alternate for Principal Deputy Assistant Secretary for Water and Science (Secretary's Designee)

**Facilitator:** Mary Orton, The Mary Orton Company, LLC

**Committee Members/Alternates:**

Melinda Arviso-Ciocco, Navajo Nation  
Jan Balsom, National Park Service/GRCA  
Eric Bobelu, Pueblo of Zuni  
David Brown, Grand Canyon River Guides  
Charley Bullets, So. Paiute Consortium  
Kerry Christensen, Hualapai Tribe  
Deborah Dixon, State of New Mexico  
Jayne Harkins, State of Nevada  
Chris Harris, State of California  
Leslie James, CREDA  
Lynn Jeka, Western Area Power Administration

John Jordan, Int'l Federation of Fly Fishers & TU  
Vineetha Kartha, State of Arizona  
Chip Lewis, Bureau of Indian Affairs  
John McCLOW, State of Colorado  
Eric Millis, State of Utah  
David Nimkin, National Parks Conservation Assoc.  
Daniel Picard, U.S. Bureau of Reclamation  
Steve Spangle, U.S. Fish and Wildlife Service  
Larry Stevens, Grand Canyon Wildlands Council  
Steve Wolff, State of Wyoming  
Mike Yeatts, The Hopi Tribe

**Committee Members Absent:**

Carleton Bowekaty, Pueblo of Zuni  
Tom Buschatzke, State of Arizona  
James deVos, Arizona Game and Fish Department  
Dawn Hubbs, Hualapai Tribe  
Leigh Kuwanwisiwma, Hopi Tribe

Ted Rampton, UAMPS  
Tanya Trujillo, State of California  
VACANT, Navajo Nation  
VACANT, San Juan Southern Paiute Tribe

**USGS/Grand Canyon Monitoring and Research Center**

Lucas Bair, Economist  
Helen Fairley, Program Manager  
Kyrie Fry, Communications & Outreach Coordinator  
Paul Grams, Program Manager

Diane Jacobs, Administrative Officer  
Joel Sankey, Research Geologist  
Chris Schill, Budget Analyst  
Scott VanderKooi, Chief, GCMRC

**Interested Persons, TWG Members, and Alternates:**

Steven Anderson, Southern Nevada Water Authority  
Eleanor Benton, Navajo Nation HPD - NAU  
Rob Billerbeck, National Park Service  
David Braun, Sound Science LLC  
Carlee Brown, State of Colorado (phone)  
Kathleen Callister, U.S. Bureau of Reclamation  
Shane Capron, WAPA/TWG Vice Chair (phone)  
Bill Chada, U.S. Bureau of Reclamation  
Clint Chandler, State of Arizona  
Marianne Crawford, U.S. Bureau of Reclamation  
Kevin Dahl, National Parks Conservation Assoc.  
Paul Davidson, Bureau of Reclamation  
Kurt Dongoske, Pueblo of Zuni  
Marlon Duke, U.S. Bureau of Reclamation  
Katrina Grantz, U.S. Bureau of Reclamation  
John Hamill, Int'l Federation of Fly Fishers & TU  
Lynn Hamilton, Grand Canyon River Guides  
Paul Harms, State of New Mexico (phone)  
Ken Hyde, NPS/GLCA  
Steve Johnson, Western Area Power Administration  
Steve LaFalce, Trout Unlimited  
Lisa Meyer, Western Area Power Administration

Joe Miller, FFF/Trout Unlimited  
Jessica Neuwerth, State of California  
Jess Newton, U.S. Fish and Wildlife Service  
Meghann Olson, Southern Paiute Consortium  
Theresa Pasqual, DOI Joint Tribal Liaison  
Bill Persons, public  
Andre Potochnik, public  
Jenika Raub, Salt River Project (phone)  
Sarah Rinkevich, DOI Joint Tribal Liaison  
Peggy Roefer, State of Nevada  
Dave Rogowski, Arizona Game & Fish Department  
Brian Sadler, Western Area Power Administration  
Seth Shanahan, Southern Nevada Water Authority  
Perry Shirley, Navajo Nation  
Rod Smith, DOI/Solicitor's Office  
Rosemary Sucec, NPS/GLCA  
Camille Touton, DOI  
Melissa Trammell, DOI/NPS  
Jason Tucker, U.S. Bureau of Reclamation  
Rich Turner, Grand Canyon Private Boater's Assn.  
Chris Watt, U.S. Bureau of Reclamation  
Todd Wojtowicz, U.S. Geological Survey

**Recorder:** Linda Whetton, Reclamation

**Welcome and Administrative.** Mr. Rhees, Alternate for the Secretary's Designee, welcomed the members and general public. A quorum was determined and introductions made.

- Department of the Interior Update. Ms. Touton gave the following updates:
  - As outlined in Secretary's Designee Jennifer Gimbel's July 8, 2016 memo ([Attachment 1](#)), it's important to keep moving forward on the FY15-17 Triennial Work Plan.
  - Many people have done a lot of work to finalize the LTEMP EIS and the AMWG priorities will continue through the next administration.
  - The Department will be nominating Mr. Tom Iseman to be the new Secretary's Designee.
  - The Department is in the final stages of hiring Ms. Theresa Pasqual as the DOI Joint Tribal Liaison.
  - Ms. Christine Lehnertz has been nominated to be the new NPS member on the AMWG.
- Approval of May 25, 2016 Meeting Minutes. Motion to approve proposed by Mr. Harris, seconded by Mr. Nimkin. They were approved by consensus as written.
- Action Item Tracking Report ([Attachment 2](#)).
- Progress on Nominations and Reappointments. Mr. David Brown was welcomed as the new member representing Grand Canyon River Guides. Mr. Clinton Chandler is in the process of being nominated to replace Mr. Tom Buschatzke for the State of Arizona. The following individuals have been approved to serve on the TWG: Peggy Roefer (member, Nevada), Dawn Hubbs (alternate, Hualapai Tribe), and Mark Anderson (alternate, GLCA).
- AMWG Charter Update. Ms. Callister will assume leadership for the Charter Ad Hoc Group (replacing Beverly Heffernan) in revising the charter that terminates on August 23, 2016.
  - **Action Item:** Anyone desiring to participate in the CAHG should contact her ([kcallister@usgr.gov](mailto:kcallister@usgr.gov)).
- Introduction of New TWG Chair. The TWG unanimously selected Mr. Seth Shanahan to replace Vineetha Kartha as the new TWG Chair at its June meeting. He'll assume that role on October 1, 2016.
- Introductions: Group Exercise. Ms. Orton passed out cards and had the members/alternates answer four questions. At various times during the meeting, Mr. Rhees read some of the cards and the members guessed the identities. It was a fun and informative process.

### **FY 2017 Budget and Work Plan**

- TWG Review of FY17 Budget – Ms. Kartha. The Budget AHG had considerable discussion on the role of guiding documents in the budget process, specifically the Scott Loveless guidance document. There was concern about how the LTEMP ROD would affect the budget and implementation of cultural resource budget items. There was agreement that GCMRC and TWG would review the FY17 budget once the ROD has been signed to ensure no additional changes are needed. The TWG approved a recommendation that AMWG recommend the FY17 budget to the Secretary; Reclamation's portion at \$2.03 million and GCMRC at \$8,567,000 for a total of \$10,755,000.
- Reclamation Budget ([Attachment 3a](#)) – Ms. Grantz. The overall budget is organized around the four desired future conditions, TWG recommendations, and responsiveness to the LTEMP EIS. Reclamation's portion was developed using a 0% CPI rate to avoid budget shortfalls. Any funds not used from the Experimental Flow Fund will be carried over into the Native Fish Conservation Contingency Fund. At the start of FY16, the EFF balance was \$1.065 million and is projected to be around \$1.6 million in FY17.
- GCMRC Budget ([Attachment 3b](#)) – Mr. VanderKooi provided project updates:
  - Project 1: Water quality monitoring of Lake Powell and Glen Canyon Dam releases. This is funded outside the AMP with Reclamation funds. With Bill Vernieu's retirement from GCMRC last year, Reclamation chose to assume control of this program again. GCMRC is working to get data posted, and eventually it will be Reclamation's responsibility to post and maintain the data.
  - Projects 2-4. Work will continue as noted.
    - 2: Stream flow, water quality and sediment transport
    - 3: Sandbars and sediment storage dynamics
    - 4: Quantifying the relative importance of river-related factors that influence upland geomorphology and archaeological site stability
  - Projects 5-8. Some elements of these projects will be sunsetting.
    - 5: Food base monitoring and research
    - 6: Mainstem Colorado River humpback chub aggregations and fish community dynamics
    - 7: Population ecology of humpback chub in and around the Little Colorado River
    - 8: Experimental actions to increase abundance and distribution of native fishes in Grand Canyon

- Project 9: Understanding factors determining recruitment, population size, growth and movement of rainbow trout in Glen and Marble Canyons-waiting for results from the PEP panel before moving forward on future work.
- Projects 10-11. Work will continue as noted.
  - 10: Where does the Glen Canyon Dam rainbow trout tailwater fishery end? – Integrating fish and channel mapping data below Glen Canyon Dam
  - 11: Riparian vegetation studies: ground-based and landscape-scale riparian vegetation monitoring and plant response-guild research associated with sandbar evolution and wildlife habitat analysis
- Project 12: Dam-related effects on the distribution and abundance of selected culturally-important plants in the Colorado River ecosystem. This work is sunsetting; there is carryover to finish.
- Project 13: Socio-economic monitoring and research. One portion is sunsetting and then ramping up on tribal work in FY17.
- Project 14: Geographic information systems, services, and support will continue.
- Project 15: Administration support will continue.

The projected budget is \$9,060,000 with a 12% overhead rate. That rate will increase when GCMRC occupies its new facility (2018) and will be reflected in the next workplan.

**Motion** (proposed by Mr. Harris, seconded by Mr. Nimkin): *AMWG recommends to the Secretary of the Interior her approval of the GCDAMP FY17 budget as described in the two tables (attached to the Agenda Item Form) from the Bureau of Reclamation and the Grand Canyon Monitoring and Research Center. 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. AMWG acknowledges that tribal representatives will work with the Bureau of Reclamation on the implementation of its budget items D.2.5 through D.2.8. Passed by consensus.*

**Technical Work Group Report** ([Attachment 4](#)) – Ms. Kartha. At the June TWG meeting, stakeholders were asked to provide comments on their budget process priorities. Those were given to the BAHG with the assignment to develop a budget process and for the TWG to consider.

**Basin Hydrology and Water Year 2017 Hydrograph** ([Attachment 5](#)) – Mr. Davidson.

The forecast for water year 2017 (WY2017) is below average. The forecast ranges from a minimum probable of 6.60 maf (61%) and maximum probable at 17.00 maf (157%). The 2016 WY operating tier for Lake Powell, set in August 2015, was the upper elevation balancing tier. Lake Powell is currently projected to release 9.0 maf in WY2017. Reclamation is using the approved 2016 WY hydrograph.

- **GCD Maintenance Schedule.** In WY2017, five to seven units are expected to be available and Reclamation anticipates having enough capacity to meet the scheduled releases. For WY2017, one unit is anticipated to be down for maintenance in November 2016, leaving seven units available for a potential HFE that month.
- **WY2017 Proposed Hydrograph.** The proposed WY2017 hydrograph is the same as the approved WY2016 hydrograph. It targets lower August and September releases, reallocating water from those months to other equal value months for hydropower (mainly December and January), and avoids shifting water to June. The WY2017 projected annual releases are: minimum probable at 8.23 maf, most probable at 9.0 maf, and maximum probable at 11.91 maf. Mr. Davidson noted that if the Secretary chooses to approve the Record of Decision for the Long-Term Experimental and Management Plan, the water year 2017 hydrograph would be adjusted in accordance with the implementation plan described in the Record of Decision. The current WY 2017 hydrograph proposal is:

| Annual Release Volume       | June              | August          | September       |
|-----------------------------|-------------------|-----------------|-----------------|
| Less than 9.0 maf           | 600 kaf – 650 kaf | 800 kaf         | 600 kaf         |
| 9.0 maf – less than 9.5 maf | 800 kaf           | 900 kaf         | 700 kaf         |
| 9.5 maf – less than 10 maf  | 900 kaf           | 900 kaf         | 700 kaf         |
| 10 maf and greater          | 900 kaf or more   | 900 kaf or more | 800 kaf or more |

Mr. Wolff proposed, and Mr. Harris seconded the proposed motion. (Refer to page 1).

**Science Advisors Charter and Protocols Government-to-Government Consultations Update** – Ms. Grantz. During the May 25, 2016 webinar, some tribal representatives expressed concern about the Science Adviser (SA) Charter and Protocols and consideration of tribal perspectives in the independent review panels. Zuni and Navajo requested in writing government-to-government consultation, and Reclamation met with the Navajo Nation on July 26, 2016 and the Pueblo of Zuni on July 27, 2016. Other tribes verbally expressed interest in government-to-government consultation. The new SA Charter and Protocols are in draft form and comments continue to be accepted. The existing Charter will remain in place until the new Charter is adopted.

**Science Advisors Program – 2016 Accomplishments and 2017 Plans (Attachment 6)** – Mr. Braun. In FY 16, the Bureau of Reclamation assumed administrative oversight of the Science Advisor contract from GCMRC. The SA executive coordinator role is to ensure the independent review panels meet federal standards and complete tasks as assigned. The contract instrument (IDIQ) limits flexibility and quick turnaround, so advance planning is necessary. In the past, there was a standing panel of advisers. Now, experts will be assembled based on the disciplines needed. Mr. Braun coordinates the panels. This year he assisted GCMRC with the Fisheries PEP. He would like to have the comments from that PEP collated and available for review before the October TWG meeting. Planning the tribal cultural review is on hold until government-to-government consultations are completed; however, the SAP will move forward with coordination of the cultural resources review within the next two months.

**GCMRC Science Updates.**

Science Updates ([Attachment 7a](#)) – Mr. VanderKooi provided updates:

- o Biological Opinion (BO) Compliance – A series of triggers were identified in the BO associated with non-native fish control for multiple life stages of HBC as well as conditions in the river, rainbow trout, and brown trout. If these criteria are met, actions to control non-native fish are triggered. The triggers are summarized in the table below.

| 2011 USFWS Biological Opinion Non-native Fish Control Triggers                 |                                        |                       |           |
|--------------------------------------------------------------------------------|----------------------------------------|-----------------------|-----------|
| Trigger                                                                        | 2015                                   | 2016                  | Exceeded? |
| Adult humpback chub <7000 fish                                                 | Stable and above 7000                  | Stable and above 7000 | No        |
| Or—all three of:                                                               |                                        |                       |           |
| 3 of 5 years 150-199 mm humpback chub in the LCR drops below 910               | Lower but above 910                    | Below 910             | Yes       |
| Temperature <12 °C for 2 consecutive years at LCR                              | Exceeded 12° C                         | Exceeded 12° C        | No        |
| Annual survival of 40-99 mm humpback chub in JCM drops 25% from preceding year | Variable                               | Variable              | No        |
| And:                                                                           |                                        |                       |           |
| Rainbow trout abundance over 760                                               | Below                                  | Below                 | No        |
| And:                                                                           |                                        |                       |           |
| Brown trout abundance over 50                                                  | Too low to generate abundance estimate | Below                 | No        |

- o HBC Updates: From 2009 and 2015 data, the HBC adult population has been stable. The 2015 and 2016 spring estimates in the LCR are considerably lower than recent years. The likely cause is skipped spawning due to lower condition factors.
- o Trout Updates: Electrofishing in the Bright Angel Inflow showed trout declined from >1700 to 25 from 2013 to 2016 despite similar effort and better electrofishing conditions. Native fishes dominated the catch in 2016. Brown trout are increasing upstream of Lees Ferry. While they are a small proportion (<2%) of overall trout population in Glen Canyon, they have increased from 47 in 2012 to 580 in 2015. All trout captured were put to beneficial use: the larger fish have been preserved for human consumption and smaller fish were frozen and given to the Pueblo of Zuni for their eagle aviary.
- o Green Sunfish: An initial visual survey by AZGFD of the slough area in July did not identify the presence of GSF. A survey by NPS in early August in the small shallow pond above that is connected

- to the larger slough resulted in 26 GSF caught in 10 minutes of electrofishing. Adult GSF in the upper slough were spawning.
- Fisheries PEP: The panel focused on how the program can better balance priorities and tradeoffs among various activities in the future relative to RBT in Marble Canyon, HBC near the LCR and other locations, and native and non-native fishes. The charge to the panel also included how the program could improve research or monitoring to evaluate the effectiveness of experimental translocations of humpback chub, and how the program could modify the handling of native and non-native fishes to maintain science quality while also better accommodating Native American concerns for the value of all life-forms in the river.
  - Partners in Science: Partners in Science is a program in which scientists engage youth in collecting data that, in some cases, feeds into the AMP. For a recent Partners in Science trip, Secretary Jewell hiked in at Bright Angel and became one of the crew for five days. It was a fantastic trip and the youth felt she was the “coolest” cabinet secretary that they’d ever met.
- Status of Sediment Resources ([Attachment 7b](#)) – Mr. Grams. Results indicate that during low flows, sand supplied by tributaries (primarily the Paria River) accumulates on the riverbed and in eddies. High flows redistribute sand and build beaches, but the gains quickly erode. There were relatively large inputs of sand from the Paria River in each of the HFE Protocol years from 2012 to 2015.
    - Riparian Vegetation Monitoring with Remote Sensing ([Attachment 7c](#)) – Mr. Sankey. Results from the last overflight in late May 2013 and post-processing in 2015: (1) No significant change in vegetated area from 2009 to 2013, (2) The long-term trend is vegetation increases in zones inundated by discharges less than 45,000 cfs, and (3) The results of analysis of 1964-2013 data are consistent with 1964-2009 results.
    - The 2009-2013 monitoring tamarisk changes and tamarisk beetle impacts 2009 to 2013 will be useful for future monitoring of foliation, beetle impacts and vegetation management.

**Green Sunfish (GSF) Discussion** – Ms. Balsom. Even though conditions were right for a potential HFE last year, biologists advised against doing so in hopes of eliminating the GSF in the slough below Glen Canyon. Until recently, there were no recurrences after last year’s treatments and the Park believed they might have been eradicated. However, about 10 days ago a crew in the Glen Canyon Reach did 574 seconds worth of electrofishing in the slough and came up with 26 fish, which indicates the GSF are back. These fish can come through the generators at the dam and spawn in the slough. After discussions among NPS, BOR, FWS, AZGFD and the tribes, there will be a short-term fix as an immediate response that will be dictated by what the crews find. A long-term program needs to be established to address the possibilities of invasion of other non-natives into that reach. She invited others to add their thoughts.

- Mr. Billerbeck: The number of fish that have been found is significantly fewer than last year. They hope to conduct the first phase of activity in a way that will not require chemical treatment. They will be working closely with the tribes regarding what is done with the fish following the treatment. If a number of fish are discovered, they will be looking at similar treatment as was used last year. The Park is committed to a process for 12 months, which will require a lot of coordination.
- Ms. Trammell: They had a good, complete treatment in both of the sloughs last year but didn’t have the required permitting and compliance in place before November. Before the treatment was completed, some of the GSF present last year left the backwater and got into the main channel as water temperatures cooled in the backwater. Although there was a barrier in place by October 7, some GSF could’ve gotten out before then. The barrier net could only block part of the backwater due to the daily fluctuations. Some of the GSF were likely outside the barrier net when it was installed and later left. Once the backwater cools to temperatures lower than, or similar to, the main channel, it is more likely that the GSF would leave. Therefore the source of the GSF that re-invaded the backwater this year, is likely the fish that escaped into the river last year.

In response to a question on whether to modify the slough and run water as one of the recommendations for a long-term solution, Ms. Balsom said the Park would go through a full NEPA analysis. They’ve talked about getting assistance from the Region and are dedicating additional staff to work on the problem.

**Public Comment:**

Kevin Dahl (NPCA): Tomorrow the National Park Service will celebrate it’s 100<sup>th</sup> anniversary. In the last 10 years the Park has had their budget reduced despite increased visitation, increased management requirements, and a \$12

million backlog of maintenance needs. Please read my op-ed piece in the Arizona Republic today. Thanks to all the employees of the NPS who are here and here's to another 100 years.

Lynn Hamilton (Grand Canyon River Guides): We are so appreciative of our Park partners, our public lands, our national parks. As Americans, they belong to each and every one of us. I hope everyone gets out and enjoys their parks in this very special year. I know that once upon a time there was recreation PEP that produced some recommendations and I'm hoping that more progress can be made in that vein. Recreation is important.

**Adjourned:** 4:45 PM

## Glen Canyon Dam Adaptive Management Work Group Meeting

**August 25, 2016**

**Time:** 8:33 a.m.

**Conducting:** Brent Rhees, Alternate for Principal Deputy Assistant Secretary for Water and Science  
(Secretary's Designee)

**Facilitator:** Mary Orton, The Mary Orton Company, LLC

### Committee Members/Alternates:

Melinda Arviso-Ciocco, Navajo Nation  
Jan Balsom, National Park Service (GRCA)  
Eric Bobelu, Pueblo of Zuni  
David Brown, Grand Canyon River Guides  
Charley Bullets, So. Paiute Consortium  
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Deborah Dixon, State of New Mexico  
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Daniel Picard, U.S. Bureau of Reclamation  
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Larry Stevens, Grand Canyon Wildlands Council  
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Mike Yeatts, The Hopi Tribe

### Committee Members Absent:

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Tom Buschatzke, State of Arizona  
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### Interested Persons, TWG Members, and Alternates:

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Vineetha Kartha, State of Arizona & TWG Chair  
Lisa Meyer, Western Area Power Administration

Amy Mignella, Arizona Tribal Energy Association  
Joe Miller, FFF/ Trout Unlimited  
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Chris Watt, U.S. Bureau of Reclamation  
Todd Wojtowicz, U.S. Geological Survey  
Michael Yeatts, Hopi Tribe

**Recorder:** Linda Whetton, Reclamation

**Welcome and Administrative.** Mr. Rhees welcomed the members and public. He thanked GCMRC for hosting a great cookout last night and recognized in particular Kyrie Fry for her efforts.

**National Park Service 100<sup>th</sup> Anniversary** – Ms. Balsom. Today is the 100<sup>th</sup> anniversary of the establishment of the National Park Service. As much as we want to celebrate this 100<sup>th</sup> anniversary, our infrastructure is failing. This year 5.5 million people visited the Grand Canyon, but the facilities were built for 3 million. Parks are being loved to death across the country. Ten million dollars is spent in the GCDAMP and only a very small amount helps offset some of the administrative costs of either park. In addition, very little is spent on mitigation of effects from dam operations. As you support the science being done through this program, remember that the NPS adheres to the GCPA, which is designed to mitigate and improve adverse impacts.

**Basin Fund and Revenue Overview** ([Attachment 8](#)) – Ms. Jeka, CRSP Manager. The mission of Western Area Power Administration (WAPA) is to market and deliver clean, renewable, reliable, cost-based Federal hydroelectric power, and related services. They market, schedule, and deliver energy to long-term firm electric service customers, support grid reliability, own and operate the transmission system infrastructure, and set rates and are responsible for repayment of project debt to the U.S. Treasury from revenue. WAPA delivers wholesale energy to their customers who then deliver energy to their customers. Total revenue equals total costs and “profit” is not allowed. The money for funding environmental programs includes:

- |                                                         |                |
|---------------------------------------------------------|----------------|
| • Glen Canyon Dam Adaptive Management Program           | \$10.8 million |
| • Upper Colorado River Endangered Fish Recovery Program | \$ 5.5 million |
| • San Juan River Recovery Program                       | \$ 2.7 million |
| • Quality of Water & Consumptive Use Studies            | \$ 1.0 million |
| • Experimental Flows – Nov 2014 HFE Estimate            | \$ 1.8 million |
| – Nov 2013 HFE Estimate                                 | \$ 2.6 million |

Mr. Johnson, Manager, CRSP Energy Management & Marketing Office. A lot goes on beyond the dam on the interconnected transmission system. In October 2015 the Aliso Canyon natural gas storage facility discovered a leak, but wasn't sealed off until February 2016. A vast majority of California energy relies on this natural gas storage facility to operate their electricity generating facilities. The California Independent System Operator (CAISO) which relies heavily on gas from Aliso Canyon for their electricity generation reached out to WAPA to be “on call” to deliver emergency energy to California in the event that they could not produce or purchase sufficient energy to meet customer demand. This “call” would only be issued after all other emergency measures such as rolling brown outs and/or energy purchases from other sources were exhausted. Current restrictions (e.g., ramping, fluctuations, etc.) under normal operating conditions makes it practically impossible to increase power generation from Glen Canyon Dam to meet emergency situations. The current Record of Decision (ROD) contains emergency operating language that removes restrictions to allow WAPA to meet energy requirements during an emergency. WAPA also has an agreement with Los Angeles Department of Water and Power, similar to the CAISO agreement, to provide emergency power to the City of Los Angeles.

**Federal Tribal Liaison Report** ([Attachment 9](#)) – Ms. Rinkevich. The following updates were provided:

- Ms. Theresa Pasqual was hired as the new Federal Joint Tribal Liaison. She's from the Acoma Pueblo, located west of Albuquerque, New Mexico. She's worked with NPS on various projects and brings a wealth of knowledge and information relative to Section 106 requirements.
- Three presentations given at the April TWG Meeting: (1) Mr. Stuart Leon from Southwest Tribal Fisheries Commission, (2) Ms. Gloria Tom from the Navajo Fish and Wildlife Department, and (3) Mr. Nelson Luna from the Zuni Wildlife Department.
- Reclamation and NPS staff held government-to-government meetings to discuss LTEMP issues with Navajo Nation President Begaye in Window Rock on April 16, with the Navajo Nation Historic Preservation Office in Window Rock on July 26, and with the Zuni Cultural Resources Advisory Council on July 27.
- Ms. Rinkevich conducted a field trip to the Hualapai Tribe Native Fish Facility. With funding from FWS, BIA and BOR, the Hualapai raise native fish in the facility.

- Ms. Rinkevich participated in the Fish PEP that included presentations by Hualapai, Hopi, and Zuni. A field trip to Glen Canyon was held along with presentations on TEK.
- Tribal representatives have requested that GCMRC have more coordination with Tribes regarding research and monitoring. Tribal representatives have requested that all program reviews by the SA program include tribal participation and the need to fully integrate TEK into the AMP.

### **Stakeholder's Perspective: The River of Never-Ending Life—Cultural Resources from Navajo**

**(Attachment 10)** – Ms. Arviso-Ciocco. The Navajo Universe consists of earth, air, fire and water. They are a part of Mother Earth and exist in springs, rivers, and other entities. They consider the air and winds as holy beings that reside within the cardinal directions as part of the Sky (Father). Water is the lifeblood of the Earth (Mother) and because of its scarcity and cultural relevancy, every natural source of water is respected and considered sacred. No one holy person or sacred place is more powerful than another, each is respected and honored for the role they have on Mother Earth. Offerings of jewels, prayer sticks, pollen, and herbs are made to the environment for sustaining the people and animals on earth. Navajo traditionally take only what is needed from the environment. The Cardinal Mountains outline their aboriginal territory. They are a living culture that continues to teach and practice their connection to the land from now and into the future.

Mr. Perry Shirley would like to bring some scholars of Navajo culture who are associated with the Diné College to present to the AMWG. It is important for people to understand what the Navajo beliefs are and how the Grand Canyon has impacted the Navajo way of life.

### **GCMRC Science Presentations**

- Sandbar Modeling Project (**Attachment 11a**) – Mr. Mueller. Repeat topographic measurements from 45 sites are monitored in a two-week period every fall. HFEs cause deposition of sand and increase average bar size. Grand Canyon is a “debris fan-dominated” canyon river. River morphology is strongly controlled by hydraulic interactions within debris fans.
  - Vegetation stabilization of sandbars causes vertical accretion and channel narrowing, especially in wider parts of the river corridor.
  - More dynamic sandbars tend to be in higher energy settings where the channel is narrower and stage changes rapidly with discharge.
  - Trends at long-term monitoring sites are better understood by grouping like-sandbars, and may provide an analog for understanding canyon-wide bar behavior.
- Aquatic Foodbase of the Little Colorado River (**Attachment 11b**) – Mr. Muehlbauer. For the past three years, his group has been sampling the aquatic invertebrate community of the LCR, four times a year, throughout the entire 21-kilometer perennial reach. The LCR is home to the endangered HBC, which is a drift-feeding fish. Invertebrates live most of their lives as larvae in the bottom of the river; adults enter the drift, emerge, grow wings, find a mate, and lay their eggs back in the water. Invertebrate availability peaks in the LCR in spring and is otherwise low throughout the remainder of the year. Light availability, as influenced both by canyon shading and turbidity, exerted a strong spatial control on invertebrate densities. These results may provide insight into chub behaviors and distributions throughout the LCR in both time and space.
- Science Behind HFE Planning (**Attachment 11c**) – Mr. Topping. There's a lot of work that goes on behind the scenes in preparing for an HFE and sediment inputs are closely monitored by USGS and posted on their [website](#). He outlined a 13-step process for getting to a decision starting with when rains come into the Paria River basin to a post-facto evaluation of sand transport and sand budgets during the HFE period. For an HFE trigger, it's not so much the input, but knowing how much sand you have left by the time you get to implementing an HFE. Outside the actual accounting period, 2015 was one of the top years in terms of sediment input with over 1 million metric tons. Not counting the month of June, it was still the second largest year for an HFE. Having three large years of sediment in a row isn't very common which leads to why it's hard to predict for an HFE. If we have a year that turns out to be like 2012, we won't get a trigger because most of the sand in 2012 came in during August while most of the inputs for 2012-15 actually came into the system during September-October. Being halfway through the input season, it's unlikely we'll get a trigger but only the next few weeks will tell.

- **Long-Term Experimental Management Plan (LTEMP) EIS Update and Science Plan (Attachment 12a)** – Ms. Grantz. The LTEMP EIS is going through final editing and then it will go to press. She discussed the characteristics of the Preferred Alternative D, including the following modifications:
  - Removed the load following curtailment experiment after HFEs.
  - Clarified language about no spring HFEs (sediment triggered or proactive) in the same water year as an extended-duration fall HFE.
  - Provided for additional science review at the 10-year mark before implementation of a Low Summer Flows test.
  - Included more language regarding tribal concerns about fish management tools. Based on consultation with tribes and USFWS, included a two-tiered system to make mechanical removal at the LCR an action of last resort and provided more commitments for consultations and finding beneficial uses for fish.
  - Included additional conservation measures for HBC.

The following new actions were added to the existing conservation measures:

- Humpback Chub - Explore and evaluate other tributaries for potential translocations.
- Razorback Sucker - Determine the extent of hybridization.
- Non-native Species Control –
  - Explore the efficacy of a temperature control (warm and cool) device, including current and evolving technology
  - Explore means of preventing fish passage through dam
  - Planning and compliance to alter the warmwater slough in Glen Canyon
  - Support development of nonnative fish rapid response plan
  - Explore TMFs to inhibit Brown Trout recruitment in Glen Canyon
- Southwest Willow Flycatcher and Yuma Ridgway's Rail – Monitoring at 3 year intervals

She reviewed those items which have not changed since the draft EIS:

- Monthly volume pattern is still similar to Alternative E (the Basin States RTCD alternative) but with a higher August monthly volume (800 kaf rather than 750 kaf in 8.23 year, adjusted for hydropower capacity).
- Fluctuations are set proportionally rather than in a step-wise manner as was the case for MLFF. The level of daily fluctuations is comparable to MLFF to slightly more on average. The 8,000 cfs cap level still same as MLFF. Downramp rate is still greater than No action/MLFF by 1,000 cfs.
- Fish management tools including macroinvertebrate production flows (“bug flows”), trout management flows, mechanical removal, and low summer flows. These would be implemented with careful communication and consultation to take into account resource conditions and tribal concerns.
- Spring and fall High Flow Experiments are similar to those under the existing protocol as well as Proactive Spring HFEs in equalization years and Extended-Duration Fall HFEs in years when a very high sediment trigger is met.

Regarding mechanical removal as an action of last resort, Mr. Jordan asked if before utilizing that tool, would there be an increase in the aggressive or frequent use of Trout Management Flows (TMF). Mr. Billerbeck said the two are independent in the way they are designed and there was no change since the DEIS. The TMF will be triggered only when there is a large expected recruitment increase of the trout, while taking into account the resource conditions of the year and the total trout population size. The current data suggests that that large increase in trout recruitment could come from one of two hydrological events, either a spring HFE or equalization flows.

Responding to a question from Mr. Stevens on whether the role of AMWG would change and whether NPS and Reclamation would co-lead the GCDAMP, Ms. Caramanian (via phone) told him there will be no changes to the AMWG's role or the budget process from the LTEMP.

**LTEMP Science Plan Update (Attachment 12b)** – Mr. VanderKooi. GCMRC submitted a draft science plan to the co-lead agencies at the end of last year, comments were received, and staff made revisions in early June. GCMRC is currently addressing another round of comments so the plan remains a work in progress. When LTEMP EIS is finalized, the plan will be completed and accompany the Record of Decision.

**Green Sunfish Update** – Ms. Trammell. On Monday and Tuesday, GCMRC staff sampled both the upper and lower sloughs. In 40 minutes of sampling by boat in the lower slough and 40 minutes by backpack in the upper slough, they caught only two GSF in the lower slough and about 139 very small, YOY GSF (less than 1" long) in the upper slough. Densities are apparently lower now than this time last year. A series of mechanical removal efforts are planned. The fish that were caught were frozen and will be available to either the Zuni or the Navajo aviaries.

Tiger salamanders in their aquatic state were observed in the upper slough, and seven were caught in the latest sampling. This probably indicates that most of them have transformed into their adult terrestrial form. The species is currently unknown so it is unknown if they are native.

David Nimkin: The current [High Country News issue](#) talks about the broad shoulders of the NPS and the work they do under extraordinary challenges. We all depend upon the energy that is created by GCD and must honor and respect the different values and interests whether it's non-consumptive uses that people feel about the Grand Canyon or other national parks, or sacred spaces that Navajo and other tribes value in these spaces. It is the personal responsibility of each us as Americans to advocate for these special places.

Perry Shirley: President Russell Begaye asked me to extend his appreciation to all of you for the work that you've been doing in protecting the Grand Canyon — not just for Navajo or Native American people but for everyone.

#### **Public Comments:**

- Rich Turner (Grand Canyon Private Boater's Association): As I've sat through these meetings, I'm very impressed because there are 24 different objectives and yet there's been no hostility among the stakeholders. I think that is wonderful, particularly in today's time when polarization and sticking to your guns seems to be the norm. The same thing occurred with the LTEMP process. I was at quite a few of those meetings and people were bending over backwards to get our comments, to understand them, and to let us know what might be the consequences of our desires.
- Sam Jansen (former AMWG member): I agree with Rich and appreciate how this organization really makes the effort to take care of the Grand Canyon and the river that runs through it. I hope you really experience it and see what we're talking about and why it matters to us. It's a place that's been there for a few million years and hopefully it'll be in good shape for the next few million years if we take good care of it.
- Lynn Hamilton (Grand Canyon River Guides): It makes a difference when everybody can speak freely and work collaboratively and cooperatively toward common goals. We're on the eve of something that is truly historic. I believe that everybody has Grand Canyon at heart and we can give it no less than our best.
- Alicyn Gitlin (Sierra Club, Grand Canyon Chapter): The "Colorado River Days Flagstaff" events will begin in a few days. This event will bring about 20 events and 40 participating organizations to Flagstaff. Several Sierra Club members submitted comments during the scoping process but those weren't considered in the preparation of the draft impact statement. Over the next 20 years it is possible that water management through GCD is going to be affected by those agreements that affect the entire basin and so we ask that the entire basin be looked at. Before this process is finalized, we hope our requests will be taken seriously and that the best possible thinking for the Colorado River is done.

**Department Comment.** Ms. Touton said this has been a productive meeting and thanked Mr. Rhees for chairing. The Department of Interior is committed to be your partners and finishing strong through the end of the administration, and also ensuring that the role of AMWG is translated to the next administration. She thanked everyone for being engaged and looks forward to working together.

**Wrap-Up and Adjourn:** Mr. Rhees expressed his gratitude for everyone's participation. While we may all have our different interests and values, we're all brought together by Grand Canyon and the Colorado River and that will keep bringing us together. It's important to do what's right and that means we all must do our best.

**Adjourned:** 2:50 p.m.

**Documents added after the meeting:**

**Attachment 13:** EM from Katrina Grantz to AMWG, TWG, and Interested Parties, dated Oct. 27, 2016,  
Subject: HFE Documents

**Attachment 14:** Report and Recommendations Memo from Tom Iseman to Secretary Jewell dated Dec  
9, 2016

**Upcoming Meetings:**

- February 15-16, 2017 – Tempe, Arizona
- May 24, 2017 – AMWG Webinar
- August 23-24, 2017 – Flagstaff, Arizona

Respectfully submitted,

Linda Whetton  
Bureau of Reclamation  
Upper Colorado Region

## Key to Glen Canyon Dam Adaptive Management Program Acronyms

|                                                   |                                                                     |
|---------------------------------------------------|---------------------------------------------------------------------|
| ADWR – Arizona Dept. of Water Resources           | HMF – Habitat Maintenance Flow                                      |
| AF – Acre Feet                                    | HPP – Historic Preservation Plan                                    |
| AGFD – Arizona Game and Fish Department           | IG – Interim Guidelines                                             |
| AIF – Agenda Information Form                     | INs – Information Needs                                             |
| AMP – Adaptive Management Program                 | KA – Knowledge Assessment (workshop)                                |
| AMWG – Adaptive Management Work Group             | KAS – Kanab Ambersnail (endangered native snail)                    |
| AOP – Annual Operating Plan                       | 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                            |
| CAHG – Charter Ad Hoc Group                       | NHPA – National Historic Preservation Act                           |
| CAP – Central Arizona Project                     | NNFC – Non-native Fish Control                                      |
| GCT – Grand Canyon Trust                          | NOI – Notice of Intent                                              |
| CESU – Cooperative Ecosystems Studies Unit        | NPCA – National Parks Conservation Association                      |
| cfs – cubic feet per second                       | NPS – National Park Service                                         |
| CFMP – Comprehensive Fisheries Management Plan    | NRC – National Research Council                                     |
| CMINS – Core Monitoring Information Needs         | O&M – Operations & Maintenance (Reclamation Funding)                |
| CMP – Core Monitoring Plan                        | PA – Programmatic Agreement                                         |
| CPI – Consumer Price Index                        | PBR – Paria to Badger Creek Reach                                   |
| CRBC – Colorado River Board of California         | PEP – Protocol Evaluation Panel                                     |
| CRAHG – Cultural Resources Ad Hoc Group           | POAHG – Public Outreach Ad Hoc Group                                |
| CRCN – Colorado River Commission of Nevada        | Powerplant Capacity = 31,000 cfs                                    |
| CRE – Colorado River Ecosystem                    | R&D – Research and Development                                      |
| CREDA – Colorado River Energy Distributors Assn.  | RBT – Rainbow Trout                                                 |
| CRSP – Colorado River Storage Project             | RFP – Request for Proposal                                          |
| CWCB – Colorado Water Conservation Board          | RINs – Research Information Needs                                   |
| DAHG – Desired Future Conditions Ad Hoc Group     | ROD Flows – Record of Decision Flows                                |
| DASA – Data Acquisition, Storage, and Analysis    | RPA – Reasonable and Prudent Alternative                            |
| DBMS – Data Base Management System                | SA – Science Advisors                                               |
| 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                                                     |
| HBC – Humpback Chub (endangered native fish)      |                                                                     |
| HFE – High Flow Experiment                        |                                                                     |