

Glen Canyon Dam Adaptive Management Work Group Meeting

August 27, 2014

Conducting: Anne Castle, Secretary's Designee
Facilitator: Robert Wheeler (Triangle Associates)

Start Time: 9:30 a.m.

Committee Members/Alternates:

Charley Bullets, Southern Paiute Consortium
Tom Buschatzke, State of Arizona
Shane Capron, Western Area Power Administration
Kerry Christensen, Hualapai Tribe
Ann Gold, U.S. Bureau of Reclamation
Martha Hahn, National Park Service (GRCA)
Gerald Hooee, Sr., Pueblo of Zuni
Leslie James, CREDA
Sam Jansen, Grand Canyon River Guides
Tony Joe., Jr. Navajo Nation
John Jordan, Federation of Fly Fishers
Chip Lewis, Bureau of Indian Affairs
John McClow, State of Colorado

David Nimkin, National Parks Conservation Assoc.
Don Ostler, for NM, WY, and proxy for Utah
Ted Rampton, UAMPS
Seve Spangle, U.S. Fish and Wildlife Service
Larry Stevens, Grand Canyon Wildlands Council
Bill Stewart, AZ Game and Fish Department
Jason Thiriott, State of Nevada
Tanya Trujillo, State of California
Michael Yeatts, The Hopi Tribe
VACANT, State of Utah
VACANT, State of Wyoming
VACANT, San Juan Southern Paiute Tribe

Committee Members Absent:

James deVos, Arizona Game & Fish Department
Jayne Harkins, Colo. River Commission of Nevada
Lynn Jeka, Western Area Power Administration

Leigh Kuwanwisiwma, The Hopi Tribe
Dave Uberuaga, National Park Service (GRCA)
VACANT, Navajo Nation

USGS/Grand Canyon Monitoring and Research Center

Lucas Bair, Economist (phone)
Helen Fairley, Program Manager
Kyrie Fry, Communications & Outreach Coordinator

Dave Lytle, SBSC Manager
Jack Schmidt, Center Director
Scott VanderKooi, Acting Deputy Director

Interested Persons:

Matthew Allen, U.S. Bureau of Reclamation
Mary Barger, U.S. Bureau of Reclamation
Cliff Barrett, UAMPS (phone)
Rob Billerbeck, National Park Service
Jane Blair, U.S. Bureau of Reclamation
Peter Bungart, Hualapai Tribe
Dan Bunk, ____
Daniel Buscombe, GCMRC
Shane Capron, WAPA
Lori Caramanian, DOI
Marianne Crawford, U.S. Bureau of Reclamation
Kevin Dahl, National Parks Conservation Assoc.
Clark Dierks, Northern Arizona Flycasters
Kurt Dongoske, Pueblo of Zuni
Evelyn Erlandsen, State of Arizona (ADWR)
Dr. Dave Garrett, M³Research
Ed Gerak, CREDA
Rick Gold, H2O Pro, L.C.
Katrina Grantz, U.S. Bureau of Reclamation
John Hamill, Theodore Roosevelt Conserv. Partnership
Paul Harms, NM Interstate Stream Comm. (phone)
Beverley Heffernan, U.S. Bureau of Reclamation
Vineetha Kartha, AZ Dept. of Water Resources
Loretta Jackson-Kelly, DOI (Federal Tribal Liaison)
Robert King, State of Utah (UDWR)

Glen Knowles, U.S. Bureau of Reclamation
Ted Kowalski, State of Colorado
Kathy Kunysz, Metropolitan Water District
Steve LaFalce, Trout Unlimited
Bob Martin, U.S. Bureau of Reclamation
Mark Martinez, Pueblo of Zuni
Vanessa Mazal, National Parks Conservation Assoc.
Eric Millis, State of Utah (UDWR)
Gerald Myers, Federation of Fly Fishers
Jess Newton, Fish & Wildlife Service
Jessica Neuwerth, State of California (CRB)
Dr. Sarah Rinkevich, DOI (Federal Tribal Liaison)
Mike Runge, USGS (phone)
Kendra Russell, U.S. Bureau of Reclamation
Seth Shanahan, Southern Nevada Water Authority
Rodney Smith, DOI/Solicitor's Office
Bob Snow, DOI/Solicitor's Office
Justin Tade, DOI/Solicitor's Office
Shana Tighi, U.S. Bureau of Reclamation
Rich Turner, Grand Canyon Private Boater's Assoc.
Mark Van Vlack, State California (phone)
Steve Wolff, State of Wyoming
Charles Yackulic, USGS
Mike Yeatts, Hopi Tribe
Kirk Young, U.S. Fish and Wildlife Service

Recorder: Linda Whetton, USBR

Welcome and Administrative. Ms. Anne Castle welcomed the members and the public.

- Introductions were made and a quorum was determined.
- Approval of May 27, 2014, Web/Ex Meeting Minutes. Motion to approve made by Jason Thiriot, seconded by Larry Stevens. With minor edits, the minutes were approved by consensus.
- Action Item Tracking Report (**Attachment 1**). Regarding #2013.Feb.01, Ms. Gold said the Havasupai Tribe hasn't expressed interest in joining the AMWG and suggested this item be closed. The new Tribal AMP Liaison, Ms. Jackson-Kelly would like to meet with them personally. She will follow up with Reclamation staff on previous outreach efforts before meeting with the Havasupai.
- Progress on Nominations and Reappointments. Ms. Castle welcomed the following new members: Jim deVos (AGFD), Tanya Trujillo (California), and alternates Kevin Dahl (NPCA), Ed Gerak (CREDA), and Chris Harris (California). The following members were reappointed: Sam Jansen, John Jordan, Tony Joe and Leigh Kuwanwisiwma. Mr. Cliff Barrett was reappointed as the alternate for UAMPS.
 - For this meeting, the State of Utah gave their voting proxy to Mr. Don Ostler since their member hasn't been appointed. Mr. Robert King (alternate, Utah) was participating by phone, but the AMWG charter does not provide for telephone voting. The AMWG may want to consider referring this issue to the CAHG.

Reminder: If members/alternates in the vetting process have personal information changes, please notify Linda Whetton to avoid delays getting vetted by the White House Liaison Office.

Personnel Changes:

- UC Deputy Regional Director Ann Gold will be retiring on September 3.
- UC Regional Director Larry Walkoviak will also be retiring on September 3.
- GCMRC Center Director Jack Schmidt's last day will be October 31.
- Ms. Castle will be leaving the Department of the Interior at the end of September.
- TWG Chair and Vice Chair for FY2015. Ms. Vineetha Kartha will serve as TWG Chair. Mr. Capron and Mr. Knowles will continue as TWG vice-chairs. Ms. Castle thanked Mr. Jordan for serving as TWG chair for the past two years and doing a great job educating us on a variety of issues.
- AMWG Charter Renewal. The charter terminates on August 23, 2015. With Ann Gold's retirement, the chair of the Charter Ad Hoc Group will move to Beverley Heffernan. The CAHG will review/revise the charter and present potential changes to the AMWG at the February 2015 meeting.

ACTION ITEM: Anyone interested in serving as co-chair with Beverley Heffernan on the Charter Ad Hoc Group should contact her. Additionally, if anyone wants to be a regular member of the Charter Ad Hoc Group, contact Beverley (801-524-3712, bheffernan@usbr.gov).

Basin Hydrology and Operations (Attachment 2 = AIF and PPT) – Ms. Katrina Grantz. The snowpack peaked the first week of April at 111% of average in the upper basin which increased storage in almost all the basin reservoirs. Lake Powell is currently at 51% full in comparison to about 46% this time last year. The Lake Powell Unregulated Inflow for August (most probable) is 10.15 maf. Ms. Grantz pointed out that the minimum probable is not the minimum possible. There is a 10% chance that the inflows could be less than that and likewise for the maximum probable. The 24-month model run for August sets the operating tier for Lake Powell for the upcoming water year. Based upon that projection (3,597 ft), water year 2014 is in the upper elevation balancing tier for Lake Powell. In this particular tier, there are a number of possible release scenarios. The minimum and most probable scenarios are for a most probable of 9.0 maf release and the maximum probable is a 11.6 maf release, that's with a projected April adjustment to equalization.

If the projected inflow on April 1st is such that Lake Powell will be below 3,575 ft. on Sept 30, then Reclamation will release 8.23 maf. If Lake Powell is greater than or equal to 3,575 ft on Sept 30, and if Lake Mead is less than or equal to 1,075 feet, we would balance the contents of Lake Powell and Mead with a 9.0 maf release.

Ms. Grantz also observed that another issue of note is the possibility of Lake Powell going as low as minimum power pool, or an elevation of 3490 ft. The long-term planning model indicates this would not happen until 2018. In 2018, a 6% of traces are as low as 3490 in that year, and this increases to 7% in 2019.

Maintenance – There are eight units at Glen Canyon Dam with maintenance scheduled on various units throughout the year. Units 3 and 6 will be down for almost the entire water year. In order to maximize use of the power plant if there is an HFE in 2014, Reclamation plans to have a gap in the maintenance so 7 units are available. A rough estimate through the powerplant is 20,600 cfs, add 15,000 cfs through the bypass tubes for a 35,600 cfs peak HFE. The amount of maintenance ongoing at the dam means that water deliveries under very wet conditions are a challenge. The maximum probably release for water year 2015 is currently 11.6 maf; there could be issues of trying to physically move that much water through the powerplant under the current maintenance schedule, although Reclamation is constantly adjusting the maintenance schedule based on changing hydrologic conditions in the basin.

Drought Contingency Planning. Reclamation has been having ongoing coordination with Colorado River Basin stakeholders. The planning options being considered are: (1) weather modification (cloud seeding), (2) Upper Basin Reservoirs extended operations, and (3) Upper Basin voluntary demand management.

DOI-DOE Hydrograph Development (**Attachment 2a** = AIF & PPT) – Ms. Katrina Grantz. This hydrograph has been in development for the past six months and is very similar to what's been presented in past years. A hydrograph is essentially redistribution of planned monthly releases for the upcoming water year. The objective of the 2015 hydrograph is to retain sand inputs high in the system in anticipation of a potential HFE in fall 2015. This would involve targeting lower August-October releases to maintain as much as sediment as possible during that time, avoid shifting "extra" water to June, move water from August to other equal value months for hydropower, and continue to work within existing environmental compliance. Typically the months of greatest sand input are August and September. Decreasing releases in the 1,000 kaf to 800 kaf range can significantly decrease sand transport. There is less difference seen at lower flow volumes. Typically the months of July and August and Dec, Jan have the highest release volumes. In terms of preserving the sediment, it's best to decrease releases from 900 kaf to 800 kaf for August. The most likely scenario for Water year 2015 is a 9.0 maf release. The members discussed the proposed motion and then it was moved for vote.

Motion (proposed by Leslie James, seconded by Don Ostler): AMWG recommends to the Secretary of the Interior her approval of the DOI-DOE Proposed Hydrograph for Water Year 2015 as follows:

- **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) powerplant 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 IG).**
- **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 greater

- **Release objective for August is 800 kaf**
- **Release 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 powerplant capacity for high equalization releases
- **Monthly 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.**

AMP Tribal Liaison Report (Attachment 3a = AIF) – Ms. Castle - for some time the tribal representatives have requested a tribal liaison with the Department of the Interior to help Tribes effectively advocate for their positions on the AMWG. A joint tribal liaison position was created with a federal representative and a tribal representative. Sarah Rinkevich is the federal representative and Loretta Jackson-Kelly is the tribal representative. Ms. Lori Caramanian noted that Loretta has unanimous support of all the tribes. The liaisons will be responsible for communicating with the federal agencies, tribes, and stakeholders to ensure all viewpoints are heard. Secretary Jewell issued a Secretarial order (**Attachment 3b**) reaffirming the Department's trust responsibility to federal recognized tribes as part of an ongoing commitment from President Obama to emphasize the importance of tribal relationships.

Ms. Loretta Jackson-Kelly introduced herself. She is a Hualapai tribal member and has been employed with the Hualapai Tribe almost 24 years. Her experience with the AMP began as a cooperating agency on the 1995 GCDEIS. The Hualapai tribe owns 108 miles of the Grand Canyon in the northwest region. She plans to attend AMWG and TWG meetings. Kerry Christensen will represent the Hualapai Tribe at AMWG meetings to avoid any conflict of interest. Ms. Sarah Rinkevich remarked that she is looking forward to working with Ms. Jackson-Kelly and noted knowledge and history with the program. They will continue to have quarterly meetings with the tribal reps and hold other meetings as issues arise. She provided an update of her activities (**Attachment 3b**) since the last AMWG meeting, much of which included working with GCMRC and Reclamation on the TWP.

- Mr. Mike Yeatts – The Hopi tribe is very supportive of getting this joint tribal liaison position in place. They view it as a mechanism to facilitate communication between the tribal reps and researchers in the program and the agencies that are both conducting research but also management. They see the function of the liaison as one of a proxy to attend DOI meetings and report back to the tribes on significant concerns.
- Mr. Gerald Hooee – The Pueblo of Zuni concur and also see the liaisons as facilitating more involvement and communication on TEK and other tribal concerns/projects.
- Mr. Tony Joe – The Navajo Nation is looking forward to this joint relationship. He suggested that the liaisons participate in the river trip next May as it will focus a lot on Project 12. The new president and council delegates will be starting their terms and it would be good for the liaisons to meet with them on the LTEMP.

Science Updates (**Attachment 4a** = AIF) – Dr. Jack Schmidt. By 3 p.m. the USGS GCMRC website will have uploaded the first estimates of the sediment load delivered to the river from the storm event happening in real time with this meeting, and by tomorrow we should have a good estimate relative to the trigger for an HFE. He expressed great pride for the work done by GCMRC Staff and passed around a list of 20 peer reviewed articles and reports published since February 2014 (**Attachment 4b**).

Fisheries Update (**Attachment 4b**) – Mr. Scott VanderKooi. The BO trigger requires 1) abundance estimates of adult HBC of >7,000 HBC - In 2011 HBC were above the trigger level, however due to uncertainty abundance was likely underestimated. Based on a multi-state population model HBC abundance is above the trigger and stable from 2009-2012 with reasonable confidence intervals; 2) annual spring abundance of juvenile HBC in the LCR - The 2014 spring estimates indicate HBC abundance in the LCR is above the trigger is stable; 3) annual survival of 40-99 HBC Juvenile survival in the lower LCR - increased over the 2012-2013 interval - recent estimate shows over 2,175 subadults (those 150-199 mm) which is above the trigger; 4) Temperature at the confluence of the LCR exceeds 12C - This temperature has been exceeded since April and in prior years since 2003; 5) Trout abundance estimates - Data from the natal origins study indicate that all 2014 abundance estimates exceed BiOp trigger. Since 2012, there have been declines in trout abundance in the upper GLCA and Upper Marble Canyon. However, in the LCR, there has been an increasing trend in trout abundance and the biop trigger has been exceeded. Recapture data estimates indicate brown trout have been declining. Although the rainbow trout trigger has been exceeded, no other triggers have, so mechanical removal is not triggered.

Citizen Science Monitoring of Insect Emergence (**Attachment 4c**) – Dr. Ted Kennedy. Citizen science monitoring of insect emergence: Recent food web studies demonstrated that aquatic insects are key prey items for native and desired non-native fishes in the Colorado River. Aquatic insects emerge from rivers when they reach maturity, and the timing of this critical life stage change is often triggered by environmental cues, including discharge and temperature thresholds. Glen Canyon Dam has greatly altered discharge and temperature regimes of the Colorado River in Grand Canyon, which may explain why only two aquatic insects—midges and blackflies—are common in this river segment. In 2012, USGS initiated a citizen science project in collaboration with professional river guides, Grand Canyon Youth, and private boaters to quantify insect emergence for the 240 mile Grand Canyon segment of the Colorado River. Citizens conduct standardized light trapping each night in camp, yielding an unprecedented insect emergence dataset (750+ samples each year). This dataset has elucidated insect emergence patterns related to dam operations including pronounced decreases in midge emergence coincident with abrupt increases in regulated discharge. Our findings suggest that the diversity and productivity of aquatic insects in the Colorado River could potentially be enhanced through changes in flow management alone, even without more natural temperature regimes.

Measuring Bed Sediments (**Attachment 4d**) – Dr. Dan Buscombe. The success of the HFE Protocol EA – that is, high flow releases timed to coincide with periods of fine-sediment supply from tributaries – is predicated on the maintenance of a sufficient supply of sand from within the channel for rebuilding sandbars. Periodic comprehensive mapping of long reaches is necessary to constrain estimates of changes in sediment storage within an acceptable level of uncertainty, because flux-based sediment budgets become indeterminate at long (3-10 years) timescales. Changes in sediment storage are calculated by differencing high-resolution elevation maps from repeat surveys. However, for these calculations to be accurate it is necessary to distinguish between fine and coarse sediment. In addition to calculating sediment budgets, maps of bed sediment are also valuable for quantification of aquatic primary productivity and characterization of fish habitat.

Conventional methods such as physical sampling of the bed, dredging, etc., are not suitable because the coverage, precision, and frequency can't be obtained. A lot of work was done in the 1980s and 1990s using bulky, cumbersome methods such as underwater video cameras that had to be mounted to a crane and very large sights and sonar that had to be towed behind a boat. Time was spent manually going through the data and making qualitative assessments about the bed sediments. They found that

up to 100% change in sand coverage over just a few hundred meters and up to 100% change in sand coverage over the space of just two years. Sand budget from acoustic record of suspended flux becomes indeterminate over decades and it doesn't tell you the details of where the sand is, so periodically the channel has to be mapped to provide the actual mass balance. They're now using multi-beam sonar to map the telemetry of the bed and to estimate the bed sediment type as well. This new method is reliable, objective, automated, and provides very high resolution (25 cm²).

Factors Influencing Humpback Chub Population Dynamics (Attachment 4e) – Dr. Charles Yackulic. Since 2009, GCMRC biologists and their collaborators have regularly sampled a fixed reference reach in the Colorado River just below its confluence with the Little Colorado River. Mark-recapture data from this reach have dramatically improved our understanding of humpback chub survival and growth in the mainstem Colorado River, particularly with respect to juvenile fish. When these data are analyzed together with long-term system wide sampling in the Little Colorado River led by USFWS, a holistic understanding of humpback chub population dynamics emerges. Whereas mainstem temperatures and salmonid abundances play important roles in driving long-term population trends, interannual variation in juvenile chub production in the Little Colorado River and outmigration rates to the Colorado River heavily impact juvenile chub abundances over shorter time scales. This short-term variation, if not accounted for, can confound interpretation of short-term flow management treatments.

Technical Work Group Report (Attachment 5a = AIF) – Mr. John Jordan. The TWG and BAHG held several conference calls and webinars on transitioning to a three-year budget and work plan. There was broad support by the end of the process thanks to difficult and challenging meetings. He thanked Mr. Capron for his work on the TWG over the past several years, his continuing role as the TWG vice-chair, and his exemplary role as the BAHG chair in leading the TWP effort.

Administrative History AHG Update (Attachment 5b) – Mr. Jason Thiriot. The general purpose of the AHAHG is to collect information and create a history of the GCDAMP. A key product of the AHAHG has been the development of the AMP “wiki” website (www.gcdamp.com) which serves as a collaborative resource tool to aid managers and function as the “clearing-house” for the Program’s historical information related to history of events, people, sites, issues, etc. In 2014, the BAHG recommended, and the TWG approved, budget funding for the AHAHG to develop oral histories and interviews, create an on-line training “handbook” for new AMP participants, establish a website library, institute an archival and retrieval database, as well as incorporate literature containing research, reports, legislation, court decisions, meeting minutes, and other GCDAMP related actions. The AHAHG is currently evaluating communication related efforts associated with the program’s public outreach (POAHG) and will continue to improve and integrate web-tools/features to advance the WIKI site.

Budget Ad Hoc Group Update – Mr. Shane Capron. As tasked in Anne Castle’s April 22nd memo, the TWG will begin revising the 2010 guidance document describing the schedule and process for a 3-year budget and work plan.

FY2015-17 Budget and Work Plan (Attachment 6a = AIF + TWP) – Ms. Anne Castle. Ms. Castle opened the topic by stating that the objective is to have a thorough discussion on the budget and work plan in preparation for a budget recommendation to the Secretary of the Interior. She encouraged the members to raise questions and concerns during today’s presentations. She thanked Dr. Dave Garrett for his leadership of the Science Advisors and for his voluntary participation given contracting issues.

TWG and BAHG Report – Mr. Shane Capron. He thanked the TWG, BAHG and others who helped develop the TWG budget recommendation. Mr. Capron noted that Dr. Schmidt and his staff devoted considerable time to prepare the TWP and should be commended for their extraordinary efforts. He also noted the documents and steps used to help inform understanding of the TWP. GCMRC and Reclamation have been very responsive to stakeholder questions and comments. The CRAHG Report dated July 14 includes 12 comments and the GCMRC response includes responses to those comments. Mr. Capron invited tribal representatives to highlight any issues that he had not addressed.

The TWG passed the following motion by consensus on July 15: *Final Motion (proposed by Kevin Dahl, seconded by Jerry Cox): The TWG recommends that the AMWG recommend for approval, the Glen Canyon Dam Adaptive Management Program Triennial Budget and Work Plan – Fiscal Years 2015-17 (Draft June 6, 2014) to the Secretary of the Interior, provided that such approval does not include approval of flows described in GCRMC Project 5. The revised work plan should include changes agreed to at the June and July TWG meetings as described in the TWG minutes.*

Science Advisor Report (Attachment 6b = Report & PPT) – Dr. Dave Garrett (Dr. Garrett noted that he was presenting not as the Science Advisor but rather as a private citizen because of contract issues). Dr. Garrett stated that six advisors had reviewed the TWP and their report was broken into three sections: (1) general comments on overall plan content and structure, (2) specific comments on project methods, design, and outcomes, and (3) a set of recommendations for the Secretary, AMWG, TWG, and GCMRC to consider in their continued assessment of the most appropriate management and science programs to pursue in 2015-17. He stated that the TWP is a very well thought out research plan and certainly the most thoroughly prepared plan the Science Advisors have reviewed. The Science Advisors paid a lot of attention to the DFCs, new DFCs, and information needs in their assessment of the TWP.

Overview of Reclamation FY15-17 Budget Consideration (Attachment 6c) – Mr. Glen Knowles. Mr. Knowles said that Reclamation's budget, without carryover, is \$2,143,397 in FY 2015. He provided comparisons between FY14 and the new FY2015-17 plan. The Reclamation budget includes \$250,000 for installation of acoustic flow meters in the Glen Canyon Dam bypass tubes to better measure HFE releases. It also includes \$364,052 taken from the Native Fish Conservation Contingency fund for key native fish monitoring and research studies conducted by GCMRC in FY 2015. In FY 2015, \$50,000 is provided to begin a GCDAMP Administrative History project to document the history of the program and contributions of GCDAMP members.

Overview of Reclamation Cultural Program – Ms. Mary Barger. The cultural program consists of eight projects and includes:

- Monitoring cultural resources in Glen Canyon NRA, such as the Spencer Steamboat after HFEs. It's an historic steamboat at Lees Ferry that was purposefully grounded in the river because it was obsolete. The wood was removed over time but the hull is still there. Ms. Barger noted that when the river is down, people like to explore it. It's barely moved in 25 years.
- Documenting the Zuni Pueblo's association with the Grand Canyon in a DVD.
- A Traditional Ecological Knowledge pilot project with the Hualapai Tribe to ecologically restore important native plant communities.
- A synthesis report on the use of TEK in natural resource programs around the world.
- An annual river trip with tribal members and GCDAMP stakeholders to promote information exchange and understanding of tribal views.
- Funding for tribal consultation on nonnative fish control; and funds for preparation of determination of eligibility forms for tribes documenting the Grand Canyon as a traditional cultural property for the National Register.

Please refer to the TWP for additional information on other projects and funding in FY 2016 and 2017.

GCMRC Budget FY15-17 Budget and Work Plan (Attachment 6d) – Dr. Jack Schmidt. The total budgets expended by GCMRC in FY13 and FY14 were about \$10.5 million, of which about \$9.0 million came from the AMP. Other money was expended from a substantial amount of carryover that GCMRC had in its reserves from previous fiscal years as well as carryover money from Reclamation. GCMRC received 81% of the AMP budget in 2014 but 80% in 2015. Even though the total AMP funds goes up slightly because of the CPI, they received a slightly smaller percentage of that number. The projected carryover in FY16 has to do with some of the subtle budget issues that arise in USGS and being able to predict its overhead rates. The program will be divided into 13 projects plus GIS research support and administrative support. The distribution of funding allocations among the major areas of science and administration is generally the same as in past years.

- There is no overflight work scheduled in the 3-year budget.
- The Core Monitoring Plan is an excellent document but needs to be revised because there were no DFCs when this document was developed.
- Many of the core monitoring activities are being implemented, especially sediment transport and water, but there are still some activities that are not close to being able to narrow down – sandbars for instance. The foodbase is a substantial effort in monitoring.
- Water Quality is on calendar year cycle and BOR will determine how to do work. However, funding has been identified for a peer review panel to discuss what's been done and how to link with Colorado River ecosystem.

In the event that the 7% reduction in FY16 project budgets is needed, GCMRC will prioritize monitoring and research activities, shift research projects from three years to two years, delay start times of some projects, and remove some projects from GCDAMP funding. The facilities overhead rate is going up considerably.

Proposed budget for FY15: \$9.55 million

Proposed budget for FY16: \$9.86 million

Proposed budget for FY17: \$9.81 million

GCMRC Facilities – Mr. Dave Lytle (**Attachment 6e**) – The facilities at GCMRC are beyond their design life and the City of Flagstaff will not renew their lease. However USGS is requesting a lease extension so that they can construct new facilities. This will extend their lease cost by about 60% from \$11/sf to \$18/sf and will be effective in FY15 and FY16. In FY17 they hope to have a new facility in Flagstaff. This facility will also be leased through GSA from the City of Flagstaff and will be much better designed for the kind of work that USGS/GCRM does. It will be about 38,000 square feet which represents an 11% decrease in the leased space from what they currently occupy. The maximum size of the offices in the new facility will be 100 square feet - a 10x10 office is the largest office that anyone will occupy and most offices will be smaller than that. These reductions will allow larger spaces for labs and a warehouse.

Ms. Castle recognized that a tremendous amount of hard work had gone into presenting the three year budget and work plan and thanked the Interior staff for their work.

Public Comment: None

Adjourned: 5:15 p.m.

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Zeke Lanck, Grand Canyon River Guides
Steve LaFalce, Trout Unlimited
Bob Martin, U.S. Bureau of Reclamation
Mark Martinez, Pueblo of Zuni
Vanessa Mazal, National Parks Conservation Assoc.
Doug Milligan, Salt River Project
Eric Millis, State of Utah (UDWR)
Gerald Myers, Federation of Fly Fishers
Jess Newton, Fish & Wildlife Service
Jessica Neuwerth, State of California (CRB)
Jenika Raub, Salt River Project
Shawna Reid, ____
Dr. Sarah Rinkevich, DOI (Federal Tribal Liaison)
Mike Runge, USGS (phone)
Kendra Russell, U.S. Bureau of Reclamation
Seth Shanahan, Southern Nevada Water Authority
Rodney Smith, DOI/Solicitor's Office
Bob Snow, DOI/Solicitor's Office
Gaylord Staveley, GCNOA
Justin Tade, DOI/Solicitor's Office
Shana Tighi, U.S. Bureau of Reclamation

Rich Turner, GCPBA
Mark Van Vlack, State California (phone)
Lisa Winters, Arizona Game and Fish Department
Steve Wolff, State of Wyoming

Charles Yackulic, USGS
Mike Yeatts, Hopi Tribe
Kirk Young, U.S. Fish and Wildlife Service

Recorder: Linda Whetton, USBR

Welcome and Administrative. Ms. Anne Castle welcomed the members and the public. Introductions were made and a quorum was determined. She thanked GCMRC for hosting the wonderful barbecue last night with special recognition to Carol Fritzinger and Kyrie Fry for helping with the logistics and planning.

Glen Canyon Dam 50th Anniversary Celebration – Mr. Matthew Allen, Reclamation public affairs officer. Mr. Allen noted that invitations would be sent out next week for the celebration of the 50th anniversary of power generation at Glen Canyon Dam. The event will be held on September 27, 12-4 p.m. on the crest of the dam. Secretary of the Interior Sally Jewell will be the keynote speaker. Complimentary tours of the dam will be available.

National Historic Preservation Act – Ms. Mary Barger. Reclamation is working on a new Programmatic Agreement with NPS on operations of Glen Canyon Dam. Ms. Barger noted that the biggest challenge is trying to determine the Area of Potential Effect (APE), the area that could be affected by the actions being proposed under LTEMP. Reclamation and NPS are working with the Office of the Solicitor on defining the APE. A white paper was issued on that, and they initiated consultation with everyone on the project. A draft Programmatic Agreement (PA) was sent out on August 8 for comments from all the interested parties that could be signatories to the PA. Ms. Barger explained that signatories would be entities who have a real, legal reason for participating and have a critical interest or a fiduciary interest. She requested written comments be submitted to her prior to a scheduled meeting in Flagstaff on September 23-24, 2014.

Mr. Dongoske said the draft PA didn't fully address the issue of the Grand Canyon being a traditional cultural property. He stated that people should recognize that the Grand Canyon, the Colorado River, and the Little Colorado River are registered eligible traditional cultural properties and understand their importance to the Native American tribes. Mr. Dongoske observed that it would be difficult to deal with the concept of how you mitigate the sacred content. It will require some creative thinking about how to identify actions or activities that deal with the whole host of associative values that the tribes have for this place. Ms. Barger agreed that additional discussion was needed. Mr. Yeatts asked if there were any plans to list Glen Canyon Dam as a historical registered property. Ms. Barger told him there has been some contact with the Denver Office staff - contact Nancy Coulam if you need more information.

ACTION ITEM: Comments are due on the revised Programmatic Agreement to Mary Barger by September 13, 2014 (in preparation for a meeting in Flagstaff on September 23-24, 2014).

FY2015-17 Budget and Workplan (cont.)

Proposed Motion (by David Nimkin, seconded by Larry Stevens): AMWG recommends the FY2015-17 Triennial Budget and Work Plan from the Bureau of Reclamation and the Grand Canyon Monitoring and Research Center, **as presented to the AMWG at their meeting August 27/28, 2014**, to the Secretary of the Interior for approval.

Ms. Castle clarified that the additional redline language was intended to capture the specifics of the TWG motion in referencing the budget.

Mr. Stevens commended the USGS on preparing the plan. He additionally stated that the program will always need a plan and that while great progress has been made, more progress is needed in moving towards a socio-ecosystem model. He stated that it's important to remember that a goal for this

program addresses issues such as the nutrient budget. Understanding sand and flow is the template on which the living portions of the ecosystem function but the next thing is to know the nutrient budget to understand whether or not Glen Canyon Dam may be gradually stripping nutrients from the functioning of the Colorado River ecosystem downstream and therefore influencing the capacity of the river to support aquatic life and the quality of vegetation. This plan doesn't give much back to the canyon in terms of restoration, for \$30 million native vegetation could be restored to the entire Colorado River system in Grand Canyon. Science by itself is not going to get us to where we want to be - a comfortable balance between economic and environmental issues where the benefit of science to understand this 3-year plan will give us a boost in understanding how the ecosystem works, fitting for this 50th anniversary, but it won't get us where we need to be in terms of real ecosystem management from science to society. The job of establishing those goals is up to this group and certainly to the NPS and Native American tribes because they're landholders in that landscape. Mr Stevens concluded that over the next three years the group should to focus on how to use the science better.

Mr. Capron said one unresolved policy issue is water quality. He said there was some benefit in giving the TWG guidance to allow them to talk about this more. There are a variety of stakeholders that are interested in long-term impacts to Lees Ferry and water quality and Dr. Schmidt pointed out that Lake Powell and the type of water that may be released long-term. Ms. James brought up the question yesterday on whether sediment augmentation was off the table and TWG could have a good conversation on this issue. TWG includes different stakeholders looking at these issues from different perspectives – Lees Ferry trout fishery management plan and a lot of other avenues and he thinks it would be helpful for the TWG to have those conversations.

Final Motion (proposed by David Nimkin, seconded by Larry Stevens): AMWG recommends the FY2015-17 Triennial Budget and Work Plan from the Bureau of Reclamation and the Grand Canyon Monitoring and Research Center, as presented to the AMWG at their meeting August 27-28, 2014, to the Secretary of the Interior for approval.

Motion passed by consensus.

Brainstorming Session on AMP Issues – Ms. Anne Castle led the AMWG members through a brainstorming session of issues and ideas to be considered during future discussions on AMWG's work plan. The session was intended to allow for candid discussion of a variety of issues, including those that may not be currently allowable within existing policy and law. The following categorizes and summarizes the issues discussed by AMWG members in response to the question "What issues/concerns/challenges do you feel AMWG should focus on over the next 3 years and/or the long term? Why?"

Issue Area #1: Greater Concentration on Restoration

In the next 3+ years, some AMWG members would potentially like to address the following *restoration issues*:

- Examine how much money is dedicated to on-the-ground-actions versus studying and researching.
- Include more emphasis on improving the Glen Canyon ecosystem.
- Consider invasive species, especially with the onset of low lake levels and higher temperatures.
- Consider issues related to water quality, specifically temperature and turbidity.
- Improve habitat in riparian areas.
- Monitor riparian habitats.
- Consider efforts that could keep other species from being listed (MSCP has had a focus on this).
- There is concern that the Grand Canyon National Park is "dying of 1,000 cuts."

Issue Area #2: Holistic View of the River

In the next 3+ years, some AMWG members would potentially like to see a more *holistic management plan*, and commented that:

- In the future, there will be less water, more fluctuations, reservoirs will trap sediment, and the river will be smaller with the dams. What is it AWMG wants to see for the whole river?
- AMWG should think in terms of the broader basin – where is the biggest bang for the buck?
- By concentrating on Grand Canyon National Park, what opportunities do we miss elsewhere in the watershed?
- AMWG should take a broader look at sediment.
- Physical and social systems are important to consider in addition to the science research.
- The human element can get lost in the science program. Humans are an essential element in the science and humans are stewards of the environment.
- There is a limited amount of information available for all nine national parks – a basin wide approach may address this.
- Managing the Colorado River in its entirety may lead to better choices.*

**Concerns were expressed about expanding the geographic scope and adding potential new AWMG members to cover a larger geographic area, which are captured in Issue Area #8.*

Issue Area #3: Desired Future Conditions (DFC)

In the next 3+ years, some AMWG members would potentially like to see the ***Desired Future Conditions*** revisited and expanded, and commented that:

- AMWG should revisit the DFCs.
- Over the next few years, AMWG stakeholders should work to take the DFC document to the next level. The existing document has some incompatibilities. It will be important for AMWG to look at the inconsistencies in the current DFC document.
- Should DFCs be defined for the whole watershed?
- AMWG should take DFCs to the next level by writing goals with more specificity, especially related to humpback chub and sediment.
- The group should determine what questions it has answered over the years and consider how to tie these answers in with DFCs.
- Change DFCs to “Desired Conditions.”

Issue Area #4: Updating AMWG’s Foundational Documents

In the next 3+ years, some AMWG members would potentially like to see ***AMWG’s Foundation Documents*** revisited, and commented:

- How does this question on AMWG’s focus for the next three years relate to the need to revise the Strategic Plan?
- Review the core monitoring plan – what questions are important to consider in this plan?
- GCMRC’s Big Questions have helped. What should our AMWG vision be now?
- AMWG should clearly articulate the importance of Glen Canyon and how AMWG makes decisions, as well as clearly explain how AMWG’s work impacts the Grand Canyon National Park.
- The Grand Canyon Protection Act puts a priority on the Grand Canyon National Park.
- AMWG’s foundational documents should have the Grand Canyon National Park as the foundation for the work AWMG does.
- AMWG needs to determine what questions it is trying to answer.
- AMWG should develop a science plan out of the Long Term Experimental and Management Plan (LTEMP) and determine what will be important for science and how to prioritize the science.
- The Public Outreach Ad Hoc Group (POAHG) should be used to communicate with the public positive aspects of the AMWG program.
- AMWG’s philosophy on what it is really after needs to be defined – we often lose sight of this.
- There is a need to revisit the LTEMP and think about what was left out.
- AMWG needs to consider the unique components of what we have and better understand the various interests at the table. What do people care about?

Issue Area #5: Incorporating Tribal Values

In the next 3+ years, some AMWG members would potentially like to see **tribal values** more readily incorporated into AMWG's work, and commented that:

- One of the main challenges for AWMG is how to incorporate Native American values into the program.
- Tribes have a much more holistic view of how to manage the ecosystem. There has been a lot of progress on how to mesh the two differing viewpoints, but more needs to be done. This would include broadening the focus to the whole system and looking at a broader range of resources (types of fish, tribal restoration, expand within the socio-economic Tribal aspects).

Issue Area #6: Concentrate on Big "Payoffs"

In the next 3+ years, some AMWG members would potentially like to see more of a **focus on "big payoff" efforts**, and commented that AMWG should:

- Look at areas where agreements can be reached instead of dedicating resources to issues that will be near impossible to reach agreement.
- Spend our resources where there will be the biggest gains – will this be watershed wide or a specific segment of the river?
- Determine where existing resources are best spent.

Issue Area #7: Humpback Chub

In the next 3+ years, some AMWG members would potentially like to see the following changes related to **Humpback Chub**:

- The U.S. Fish and Wildlife Service's recovery plans for humpback chub should have more specificity for the recovery goals and a plan on how to reach those goals.
- Delist humpback chub and possibly help other basins with humpback chub.
- Consider raising humpback chub for future introductions. Why can't humpback chub benefit from rearing?

Issue Area #8: Leadership & Future Membership

In the next 3+ years, some AMWG members would potentially like to see **membership changes**, and commented that:

- AMWG works best when the Secretary pays attention to the program. This is especially important if AWMG starts looking at the whole river.
- Potential AMWG membership invites to upstream and downstream groups, including the Lower Colorado River Multi-Species Conservation Program (MSCP) and Mexico, may help with understanding the different programs on the river and creating an integrated river system.
- If membership is expanded, it will be important to consider the issues associated with expanding up into tributaries. Looking at how the CRSP program deals with multiple state issues may be a good starting place.
- If membership expands, what would others bring to the program? Federal agencies would likely not provide all the resources.
- It is important to tap into the experience of a wide variety of folks.
- The process should continue and expand.

Issue Area #9: Hydropower

In the next 3+ years, some AMWG members would potentially like to see the **value of hydropower considered**, and commented that:

- The value of developed water in the West and hydropower often does not get recognized enough. To get the fixes this area needs, AWMG needs a better understanding of what has been achieved and the complete value of developed water (e.g. decreased CO2, agricultural and human uses). What do we trade for when we make these choices?
- With the focus on greenhouse gas emission reductions, electric utilities find themselves in a place of wondering what to do.

- Hydropower is an important component of reducing greenhouse gas emissions.

Issue Area #10: Climate Change Responsiveness

In the next 3+ years, some AMWG members would potentially like to answer this question related to *climate change*:

- What needs to be incorporated into AMWG's discussions to ensure that climate change is accounted for and the Glen Canyon ecosystem remains resilient?

Ms. Castle stated it's important to honor the developed water and hydropower values. The GCPA values the ecosystem and is subject to the Law of the River. She intends to share the comments, concerns, and visions expressed in a document for consideration by Secretary Jewell and her successor.

Long-Term Experimental and Management Plan EIS Update – Ms. Lori Caramanian. In January 2011 Secretary Ken Salazar announced an LTEMP EIS would be undertaken. It has been almost 20 years ago since the 1995 EIS was completed and a lot has been learned. Based on scientific results, the stakeholders are better informed to make sound decisions for the long-term operation of Glen Canyon Dam.

The Hybrid Alternative (Attachment 7a) – Ms. Kendra Russell. This is a new alternative for the LTEMP but is still under development and analysis. It has not yet been the subject of government-to-government consultation and results are preliminary. She presented information on the alternative, experimental design, and analysis of climate change effects. Benefits of the hybrid alternative relative to the original alternatives considered:

- Blends two alternatives (CDAS and RTCD) that were weighted highly by a wide variety of stakeholders in structure decision analysis process
- Uses the monthly volume pattern of RTCD that more closely matches power demand to improve hydropower performance and sediment conservation
- Represents an improvement over CDAS and RTCD in terms of sediment transport and conservation
- Proposes Trout Management Flows (TMFs) to manage the trout population and manage risks related to humpback chub
- Tests a variety of condition-dependent elements to improve sediment and humpback conservation

Current Schedule

- Oct 10 Administrative Draft EIS
- Nov 7 Complete Hydropower Analysis
- Dec 1 CA Draft Distributed
- Dec 22 CA Review Complete (15 business days)
- Jan 30, 2015 Public Draft

Concerns

- Reporting requirements within the HFE Protocol
- Pueblo of Zuni wants consultation on how HFEs are being done and the production of chub and how HFE ties into the Biological Opinion. They prefer gov't-to-gov't consultation specific to spring HFEs.
- Allow as much lead time as possible before an HFE to allow Western to make adjustments

NPS Passive Use Values Study (Attachment 07b) – Dr. Bruce Peacock. The purpose of this study is to update the 1995 Welsh et al. study and provide current information about values held by the American public for Grand Canyon and Glen Canyon resources. Data gathered will include information on individual characteristics and familiarity with the park and river ecosystems, and preferences regarding resource management outcomes. In explaining "passive use," Dr. Peacock said that economists divide up values that people hold for things into two broad categories, one is direct use (physical interaction with the resource) and the other is the perpetuity use (knowing the resource exists or will be preserved in a given condition). Survey respondents will be asked their preferences among scenarios with different

management outcomes, for example river beaches, native fish populations, trout populations, and cost. For this type of survey respondents are not given details of EIS alternatives, but are only given information about the resource outcomes. The survey will have two strata, regional household sample (eight counties surrounding dam and river corridor) and a national household sample. A nonresponse bias phone follow up will also be conducted. Upon completion of the review process, the next steps will be to work with OMB to consider all comments received, conduct a pilot survey, and then a full public survey.

Planning for a Fall 2014 HFE (Attachment 8a = AIF & PPT) – Mr. Glen Knowles. The HFE Protocol has three steps involved, a planning and budgeting component, a modeling component, and a decision and implementation component. The protocol allows for a store and release concept that GCMRC developed. There are two sediment accounting periods and they're timed to sediment inputs from the Paria River and the LCR. The windows are based around when inputs are received into the system from those two major tributaries. HFEs can occur in October-November and March-April. They found that most of the inputs are received in September which means that from a planning perspective, a decision to conduct an HFE can be made in mid-October. For a spring HFE, a decision would be made in mid-March. If we get a spring HFE, it will be a less constrained timeframe to make that decision. Other parameters that factor into conducting an HFE would be duration, magnitude, and ramping rates. HFE protocol reporting occurs in several settings, including the GCDAMP annual reporting meeting held every January and in regular AMWG and TWG meetings. The Department will conduct a comprehensive review of the Protocol after multiple HFEs (at least 3) have occurred. As of today, there has been a cumulative sand load of 110,000 tons. The biggest HFE we could do would be at 36,600 cfs for 96 hours and would need 600,000 tons of sand. Mr. Jordan requested Reclamation block out a period of time when an HFE might occur and inform the Marble Canyon businesses so as to allow them to conditionally notify possible clients and businesses.

Status of Fish Resources (Attachment 8b) – Mr. Scott VanderKooi. Trout have been decreasing in Glen Canyon since 2008. In 2008, after the 2008 spring HFE, and there was a large, robust response in RBT production, and in 2011 was an equalization year with another big response in RBT abundance. To the scale of those events, they're not seeing a response in RBT populations in Glen Canyon following the two fall HFEs. The vast majority of fish are found close to where they were marked indicating they moved very little.

Status of Sediment Resources (Attachment 8c) – Dr. Paul Grams. The last data point in Marble and Glen Canyon was in September 2013 before last fall's HFE; the next data point collection will be in September. The results show that the response to the 2013 HFE was at least similar to what was observed before. The flood was lower magnitude so smaller bars were expected, but that isn't evident in the photos. If bars are larger now than a year ago, it could be the result of (1) the fact that more sand was available in 2013, (2) the longer duration of the 2013 flood, or (3) the cumulative effect of the two floods in two consecutive years, or some combination of those factors. The next survey will help figure that out by showing whether there is a cumulative increase or not.

New Information on Razorback Sucker in Western Grand Canyon (Attachment 9) – Ms. Beverley Heffernan. In June the Department issued a press release announcing that researchers had recently discovered razorback suckers spawning in the lower Colorado River within Grand Canyon National Park. The detection of larval RBS, believed to have been missing from the Grand Canyon since the 1990s, provides evidence that these fish may be naturally reproducing in an area where the species has not been seen in over 20 years.

Minute 319/Pulse Flow (Attachment 10) – Mr. Bob Snow. The work that this program has done and the addition of the environmental focus to the operation of Glen Canyon Dam has been a real inspiration to people around the country and the world. What happens at GCD, the integration of greater respect for environmental considerations, respect for impacts on downstream monitoring, that's now part of the culture and what we do. Minute 319 allows Mexico, which has a dearth of storage capacity, to store

some of its Colorado river allotment in Lake Mead. This arrangement is an extension of Minute 318, which modified the 1944 Water Treaty after an earthquake in the Mexicali Valley in 2010 severely damaged Mexico's canal-based water distribution system. Under the treaty, it was use or lose but under Minute 318 they could leave water in the reservoir and get it back at a later date. Minute 319 was signed on November 20, 2012, one day after the high flow event at Glen Canyon Dam. On May 15, 2014, a high tide reunited the Colorado river and its final destination for the first time in 16 years after water demand and allocation had kept it back for most of the last 50 years.

Stakeholder Presentation– This agenda item will be rescheduled for another meeting.

Farewell to AMP Members – Ms. Castle announced that several people will be leaving the program and wanted to recognize their contributions:

Ann Gold will be retiring on September 3rd. She has been the deputy regional director at Bureau of Reclamation. She began her federal career with the Soil Conservation Service, spent some time with the Forest Service, and worked with the BLM before joining Reclamation in 1983. Ann did tremendous work in crafting the desired future conditions and specifically the Colorado River Ecosystem component of the DFCs which was really hard but putting the DFCs in place was one of the seminal achievements of this Adaptive Management Work Group. She also led the Charter Ad Hoc Group and collected all the findings from the Institute on Environmental Conflict Resolution and worked through what the charter should look like going forward. She was presented with a copy of the book, "The Colorado River - Flowing Through Conflict" personally inscribed by author Pete McBride. Ms. Loretta Jackson-Kelly presented Ann with a pottery bowl on behalf of the AMWG tribes and described the significance of the bowl's design noting the stars in the universe represent all the knowledge and all the wisdom she's acquired and that she'll have the rest of her years to enjoy.

Ann thanked everyone for the gifts and well wishes. She said it was an honor to participate in the AMWG and even though they disagreed at times, the group has come a long way.

Dr. Jack Schmidt will be leaving GCMRC at the end of October. He'll be returning to Utah State University in Logan, Utah. And while he's well recognized as an authority on Colorado River geomorphology, he also spends a lot of his time working in the Rio Grande - Rio Bravo system particularly around the Big Bend area. His role as chief of GCMRC has brought greater visibility to the Center and great credibility to this program and has advanced the science, management, and operation of Glen Canyon Dam. Jack received the Director's Award from the National Park Service in 2010 and also a Star Award from USGS two years ago. Ms. Castle praised him for talking to the AMWG in a way that made complex science work interesting and understandable. He was given a copy of "The Colorado River - Flowing Through Conflict" with the author's dedication of "To Jack Schmidt, With heartfelt thanks from the water community, for your unique contribution to advancing the science and river operations in Glen and Grand Canyon." – Pete McBride

Jack thanked Anne, Lori, and Bob for being so wonderful to work with and being supportive at the highest level. He thanked Dave Lytle for making it possible for him to be himself and still keep his job. He expressed appreciation to all the stakeholders he's gotten to work with. But mostly he thanked his staff for being such hard workers and dedicated to doing the best science possible. He said, "I've been part of this river for 35 years. The only person in this room who has worked longer on the Colorado River is Larry Stevens and I'm honored to be on the same page with Larry. We've come such a long way. I've been part of so many things. Whatever you think of him, this program wouldn't be where it is without Dave Wegner, and what he started way back then. The whole cast of scientists who didn't really know what they were doing back in the 1980s who then sat around on sandbars and beaches and said well, you know this could be a better place than it is but it was partly science and it was partly sitting with river guides. A bunch of us sat around and in my field book wrote the first draft of what we called the beach bill that ended up being a draft of the Grand Canyon Protection Act, coming up with the idea that we ought to have floods in Grand Canyon and then working on that for many years before it could be implemented.

I've had wonderful students to work with. And it's one of my greatest satisfactions that Paul Grams is now on the staff at GCMRC. Dave Dean is now on the staff at GCMRC and that I have students who now work throughout the basin. The reality is that the Colorado River has given me much more than I've given it. It gave me a career. It gave me a passion. It gave me an entire professional life. I'm just going back to being a professor because I think that's a good place for me to be. I think that's the bottom line. What I've learned from all of you in this three years is the depth of dedicated service from government civil servants and government appointees and stakeholders who represent agencies and just how much work goes on behind the scenes, how much selfless behavior and actions to make the world a better place, that you are all part of. And maybe I was a little cynical about that once, but I have learned so much to appreciate what all of you have done. From my end, you know as Larry and I and others wrote in a paper in the late 90's: "that America could have whatever kind of Colorado River it wanted. It just needed to figure out what it wanted." I still believe it and I have tried to work hard to get GCMRC to contribute the basic information so that you could decide. And sure, I have an opinion. Some of you know what my values are but the bottom line is that GCMRC could give you the best information, we can all make the best decision. I have a great belief in the fact that we have the best river science in the United States. I celebrate diverse opinions and it's just been a great honor to be part of this program. Thanks an awful lot. I would really appreciate it if you all could sign my book.

Anne – Thank you Jack. So I'll close out the stakeholder perspective. This program was the first thing I started with when I came to the Department of the Interior. I came to Interior in July 2009 and there was an AMWG meeting scheduled for August. And that was going to be the first AMWG meeting after what had been a very contentious one in April. There had been divided votes and there were minority reports by Grand Canyon Trust and Grand Canyon River Guides about the votes that had been taken. There was polarization among the federal agencies that had been occurring prior to that time resulting in headlines in Washington. It was not a good time for this program. I remember starting my job at the Department of the Interior not having a clear idea of what this program did. Bob Snow and Larry Walkoviak would schedule briefings with me to get ready for the upcoming meeting in August. They'd be scheduled for a half hour, and two and half hours later we'd still be talking. And they'd still have way more to say. They were trying to feed it to me in logical chunks, but there was just so much history and so many issues on the table that it was a little overwhelming. There was a lot of tension in the room at that first meeting. It was palatable and it was a very different atmosphere than what exists in this room today. I think that this program was thirsting for a change. We said there was a lot of backlog. The DFCs had been hanging out for a long time and not getting finalized. I think that nobody wanted to see the AMWG continue forward in the same way that it had been. So I've always felt like this was the program, this was the set of people that I first got to know and first learned from about the complexity of the relationships on the Colorado River, the multitude of different interests and considerations involved, and as Jack said, the dedication and the commitment and the public service oriented spirit of all of these individuals. So I've learned a tremendous amount from you. It's really become a part of who I am, my interactions with this group and having the incredible privilege to work on these issues. I have thought every day of the last five years that I'm so lucky to have the job that I have. And this is where I get emotional, part of it is the issues, part of it is the incredible work we do, and part of it is the wonderful people I work with – like Lori, Bob, Jack, and Tanya. I won't go on because I would list the entire room. So I thank you for your participation, for your friendship. I always feel like that part of my job in this program is to push people a little bit beyond their comfort zone because we want to be thinking about the other points of view, about the other interests that have to be balanced and we have to be pushed a little out of our comfort zone in order to do that. I hope I've been an equal opportunity discomfort creator because then I feel like I've done my job well. But thanks to all of you for your dedication to this program. It will be a seamless transition when I leave. I don't know who my successor will be but what I do know is that this program has developed expectations of how you interact with each other and how you all move the operation forward and protect the incredible resources of the Colorado River and Grand Canyon as you are pledged to do. Your expectations are high and they should be and so you will be taking this program forward into the next 5, 10, 20 years and it's going to be great and I'm going to be watching. Thanks.

Ann Gold, joined by the Reclamation employees. We tried to catalog so many things that you did. I wrote down a bunch – your great leadership that turned this body into a consensus building body. How you focused the TWG on technical issues instead of the policy issues. You guided completion of the DFCs. You created a more streamlined multi-year budget process. You provided leadership that put the non-native fish control and HFE protocol in place, and just overall have been a wonderful person to work with. I don't think that the discussions we had today (choking up) could have occurred before you came to us. We want to present you with this gift, one of our favorite pictures, the HFE in 2012 at night.

Gerald Hooee (Zuni) – This is an item (Indian necklace) coming from all the tribes that participate in this. This is an item that includes sacred objects in this pouch that are part of all our tribes and used in the different ceremonies that we have. Loretta asked if I could take some time and do a little blessing on it. She gave it to me yesterday so I put my two cents into it. This is from all of us as tribes and we give it to you for protection, for you to look at and for you to use in whatever endeavors that you have. And whatever your future holds for you to use it as a positive way to help you to achieve whatever else you want to achieve. We really appreciate the work you have done. I know I haven't been a part of this for that long, but I have really enjoyed participating in this and to be able to present our tribal views. We as tribes really want to thank you for what you have given to us and what you keep on giving to us no matter what. And for you to have this and hold onto it and for it to help you for whatever you do after, and where ever you go. That it will always protect you and always be there to help you out. So thank you. (applause).

Anne – Thank you. I had not previously worked with tribes before coming to the Department of the Interior and it has been such a learning experience, and also an emotional experience. The connection that the tribes have with the Grand Canyon and the creation stories you have shared – I just think they're so meaningful and they have permeated into the way that I feel about the resource so I will treasure this. I told some of you that my next adventure starting in October is hiking the Camino de Santiago with my daughter. We're going to start in the Pyrenees and try to make it all the way to the Atlantic Ocean and onto the coast of Portugal. So I will need this.

Public Comment:

Lynn Hamilton (Executive Director, Grand Canyon River Guides) – That was such an inspirational speech. I'm so thankful to all three of you for the leadership you have provided. This program has come leaps and bounds as you said from what it was and you've been part of that and we're just so thankful and we do every bit of what we can do to move it forward. Towards that end I want to leave you with a few thoughts. I know you did some visioning this morning and I wasn't able to be here for that, but you know my intention is to really simplify - that we need to take care of this place. We need to do it right and right by Grand Canyon. Obviously this program is founded on experimentation and management. I believe there should be an overarching ethic that really grounds the program and also the LTEMP EIS and that would be stewardship. It's not a word that's used a lot in this process but I know it's on people's minds and it's a way for us to give back. As stakeholders, we all want something. We all have certain concerns. We all want certain goals and want to see certain things happen, but we also want the place taken care of and there was a comment earlier that talked about a perpetuity value. The Grand Canyon is one of the most special places in the entire world and it's ours as managers and also American citizens to take care of it properly. So I have every confidence we can do that and thank you so much for everything you've done.

Adjourned: 3 p.m.

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	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	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 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
BHTF – Beach/Habitat Test Flow	MO – Management Objective
BIA – Bureau of Indian Affairs	MRP – Monitoring and Research Plan
BO – Biological Opinion	NAU – Northern Arizona University (Flagstaff, AZ)
BOR – Bureau of Reclamation	NEPA – National Environmental Policy Act
BWP – Budget and Work Plan	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
CMINS – Core Monitoring Information Needs	O&M – Operations & Maintenance (USBR 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	TWG – Technical Work Group
GCMRC – Grand Canyon Monitoring & Research Center	UCRC – Upper Colorado River Commission
GCNP – Grand Canyon National Park	UDWR – Utah Division of Water Resources
GCNRA – Glen Canyon Nat'l Recreation Area	USBR – United States Bureau of Reclamation
GCPA – Grand Canyon Protection Act	USFWS – United States Fish & Wildlife Service
GLCA – Glen Canyon Nat'l Recreation Area	USGS – United States Geological Survey
GRCA – Grand Canyon National Park	WAPA – Western Area Power Administration
GCRG – Grand Canyon River Guides	WY – Water Year
GCWC – Grand Canyon Wildlands Council	
HBC – Humpback Chub (endangered native fish)	