Glen Canyon Dam Adaptive Management Work Group
August 29-30, 2007

Conducting: Brenda Burman Secretary's Designee
Facilitator: Mary Orton

Date: August 29, 2007
Convened: 9:30 a.m.

Committee Members:

Steven Begay, Navajo Nation
Bob Broscheid, AGFD
Charley Bulletts, Kaibab Band of Paiute Indians
Jay Groseclose, NM Interstate Stream Comm.
Amy Heuslein, BIA
Loretta Jackson-Kelly, Hualapai Tribe
Leslie James, CREDA
Phillip S. Lehr, Colorado River Comm./NV
Ted Rampton, UAMPS (via phone intermittently)
Nikolai Lash, Grand Canyon Trust
Dave Sabo, USBR
John Shields, WY State Engineers Office
Sam Spiller, USFWS
Larry Stevens, Grand Canyon Wildlands Council
Dennis Strong, UDWR
Bill Werner, ADWR
Gerald Zimmerman, Colorado River Board/California

Committee Members Absent:	**Alternates Present**:
Colorado Water Conservation Bd. (member position vacant)	Randolph Seaholm
Leigh Kuwanwisiwma, The Hopi Tribe	
Steve Martin, NPS	Jan Balsom
Andre Potochnik, GCRG	John O'Brien
Pueblo of Zuni (member position vacant)	Jonathan Damp
Mark Steffen, Federation of Fly Fishers	Tim Steffen
Brad Warren, WAPA	Clayton Palmer
Ted Rampton (absent intermittently)	Cliff Barrett

Interested Persons:

Jason Alberts, DOI
Paul Alley, USGS
Matthew Andersen, USGS/GCMRC
Craig Anderson, USGS/GCMRC
Mary Barger, WAPA
Christine Beard, USGS/GCMRC
Glenn Bennett, USGS/GCMRC
Michael Breedlove, Utah State University
Bob Broscheid, AGFD
Nora Bryant, USGS/GCMRC
Shane Capron, WAPA
George Caan, Colorado River Comm./NV
Gene Cole, USGS/GCMRC
Tara Conrad, Office of the AS-WS DOI
Wayne Cook, WAPA
William Davis, CREDA
Kurt Dongoske, TWG Chair
Helen Fairley, USGS/GCMRC
Tom Gushue, USGS/GCMRC
Dave and Pam Garrett, M^{3}Research
Martha Hahn, NPS/GCNP
Stacey Hamburg, Sierra Club
John Hamill, USGS/GCMRC
Lynn Hamilton, GCRG
Norm Henderson, NPS
Doug Hendrix, USBR
Nanette Holbrook, USGS/GCMRC
Pamela Hyde, Member of the Public
Rick Johnson, Grand Canyon Trust
Matt Kaplinski, GCRG
Ted Kennedy, USGS/GCMRC
Robert King, UDWR
J.D. Kite, USGS/GCMRC
Glen Knowles, USFWS
Keith Kohl, USGS/GCMRC
Dennis Kubly, USBR
Jeff Lovich, USGS
Chris Mandrick, USGS/GCMRC
Andy Makinster, AGFD
Serena Mankiller, USGS
Ted Melis, USGS/GCMRC
Anthony Miller, Colorado River Comm./NV
Don Ostler, Upper Colorado River Commission
Bill Persons, AGFD
Randall Peterson, USBR
Barbara Ralston, USGS/GCMRC
Ken Rice, USBR/Glen Canyon Dam
Scott Rogers, AGFD
Gaylord Staveley, Canyoneers
Bob Snow, DOI
Scott Wright, USGS/GCMRC

Meeting Recorder: Linda Whetton, USBR

Introductions and Administrative Items: Brenda Burman introduced herself as AMWG's new Secretary's Designee, appointed by Secretary of the Interior Dirk Kempthorne on July 17, 2007

(***Attachment 1a***). She welcomed members, alternates, and members of the public. A quorum was established and attendance sheets distributed. Ms Burman welcomed Jonathan Damp, the new alternate for the Pueblo of Zuni; and presented a farewell plaque to Phillip Lehr, who is retiring.

Approval of December 5-6, 2006 Draft Meeting Minutes. Pending one correction, the minutes were approved without objection.

Approval of May 29, 2007 Conference Call Minutes. Without objection, the minutes were approved.

Review of Action Items. Mary Orton said almost all the action items were closed except for the Roles AHG review of the Science Advisors' functional recommendations.

Legislative Updates. Dennis Kubly reported on requirements from Congress to federal agencies pursuant to §1834 and §1840 of the Energy Policy Act of 2005 (***Attachment 1b***). Section 1840 required the Secretary of the Interior, acting through the Reclamation, to write a report "identifying and describing the status of potential hydropower facilities included in water surface storage studies undertaken by the Secretary for projects that have not been completed or authorized for construction" since 1939. The report (http://www.usbr.gov/power/data/sec1840.pdf) contains no recommendations, but it could serve as a reference tool for understanding historical study activities in specific locations.

The second study (http://www.usbr.gov/power/data/1834/Sec1834_EPA.pdf) required the Secretaries of the Interior, Army, and Energy to "jointly conduct a study assessing the potential for increasing electric power production at federally owned or operated water regulation, storage, and conveyance facilities." Mr. Kubly said the second study references Glen Canyon Dam and the generation of hydroelectric power using jet tubes during spills. It also notes, "[r]ecent biological opinions have resulted in decreased generation and load following capability at Reclamation's Glen Canyon Dam as well as many of the [U. S. Army Corps of Engineer] dams on the lower Columbia River." While emphasizing that the study cannot substitute for detailed feasibility analyses, it concludes, "[w]hile most of the economically attractive sites have been developed over the previous decades, those that remain and were considered viable in this report generally had modest benefit to cost ratios."

Response from the Secretary of the Interior: Quagga Mussel. Ms Burman referenced Deputy Secretary of the Interior Lynn Scarlett's memorandum (***Attachment 1c***) in response to AMWG's May 2007 recommendation to address the quagga mussel invasion of the Colorado River system. Ms Scarlett said the Department formed an interagency task force to address the issue, headed by FWS and including membership from NPS, BLM, USBR, USGS, and the Department's Invasive Species Council.

Old/New Business

1. Larry Stevens said NPS, AGFD, and the Grand Canyon Wildlands Council hope to complete a translocation of humpback chub into Shinumo Creek in October.

2. Nikolai Lash said the AMWG has been deficient in not producing three items as required in the Charter: 1) annual reports to Congress, 2) an annual review on resource status, and 3) an annual review of program status. They are referenced in sections 3e, 3f, and 3h in the AMWG Charter.

FY07 Mid-Year Expenditures (*AIF-Attachment 2a*)

USBR Mid-Year Expenditures Report. Mr. Kubly distributed copies of Reclamation's expenditures report through March 2007 (***Attachment 2b***). The percentage of expenditures varied from 16% to 56%. Overall, expenditures are at 26% when counting as unexpended the $500,000 designated as carryover for the experimental flow fund. If that were removed, it would double the percentage of expenditures in the "other" category. The other categories are in line with previous expenditures. USBR had difficulty establishing some contracts in a timely manner, but most of those have moved forward since this report was prepared. FY07 was the first year of funding for Reclamation's Section 106 compliance

responsibility, the Grand Canyon Treatment Plan and Implementation, on which USBR is working closely with NPS. This item will appear in the budget for the next 10 years at an estimated $500,000 annually.

GCMRC Third Quarter Expenditures Report. J.D. Kite said GCMRC expended 88.3% of budget through the third quarter of FY07 (***Attachment 2c***). They received $7.4 million in funding, less than the CPI cap of $80,000, and they carried over $236,000 for a total power revenue expenditure of about $7.7 million. They received about $226,000 in appropriated dollars from Reclamation for Lake Powell studies and $1 million from USGS appropriations, for a total budget of $8.9 million. He said that USGS adopted a policy this year that all administrative functions would be absorbed into overhead. By doing that, they saved $547,000, but in turn, they raised GCMRC overhead from 36% to 42%. The Southwest Biological Science Center now pays for computer systems, information technology support, budget and contracting support, clerical support, and facility costs.

GCMRC Completed Science Projects and Reports (*AIF-Attachment 3a*) Ted Melis presented on completed projects and reports. The first focused on the recently published USGS Fact Sheet on advances made in research related to conservation of sandbars. The fact sheet also provides information on the high flow experimentation results over the past ten years.

Sediment Resources. Dr. Melis gave a PowerPoint presentation entitled, "Beach Habitat Building Flow Science Plan Update and Future Steps" (***Attachment 3b***) on completed sediment resource work. He concluded that more sand supply can be achieved in three ways: 1) release enriched BHBFs more frequently (hypothesis to be tested), 2) further constrain dam releases over longer periods of time, perhaps years (known), and 3) sediment augmentation from upstream sources – Lake Powell (known).

Nearshore and Physical. Barbara Ralston distributed copies of her report, "Comparisons of Water Quality and Biological Variables from Colorado River Shoreline Habitats in Grand Canyon, Arizona, under Steady and Fluctuating Discharges from Glen Canyon Dam" (***Attachment 3c***), and copies of her PowerPoint presentation, "Effects of Varied Flows on Near Shore Physical and Biological Parameters: Results and Recommendations," (***Attachment 3d***). She said numerous studies document that dam operations affect fish reproduction and recruitment, either associated with temperature or habitat availability. Flows also affect sediment transport. In 2005, they studied the effects of steady flows versus slightly fluctuating flows on sediment transport and biological resources. They looked at both shoreline and backwater habitats, as well as temperature, turbidity, specific conductivity, pH salinity, and velocity. They also studied the abundance and composition of phytoplankton, benthic invertebrates, and fishes in shorelines and backwaters. The study's conclusion was that "measured biological and physical parameters were, in general, unaffected by flow treatments. However, results should be interpreted cautiously as time within and between treatments was likely insufficient to affect measured parameters. These results lead to the recommendation that studies like this may be more amenable to laboratory experiments first and then applied to a large-scale setting, preferably for longer duration."

Sam Spiller requested that USGS and AGFD recommend to AMWG an appropriate flow and period to determine phytoplankton, macroinvertebrate fish responses, and different types of habitats. Larry Stevens requested that GCMRC prepare a synthesis of the studies on this topic (there are at least 100) so that experiments can be put in the context of the overall questions. Randy Seaholm suggested that the conceptual model be updated to help meet resource goals.

Recent Trends in Lees Ferry. Andy Makinster described the status and recent trends of the Lees Ferry trout population. He gave a PowerPoint presentation entitled, "Recent Trends in the Lees Ferry tailwater fishery, with additional input on findings of whirling disease, crayfish, and exotic species" (***Attachment 3e***), which focused on findings from 1991 to the present. He concluded with the following:

- Reduced abundance has likely freed the fishery from density-dependent issues
    - Trout condition in 2006 similar to early 90's; Baseline foodbase/diet data would help
- Future monitoring should reveal prevalence of disease and warm-water exotic species

- Disease and monitoring will continue; AGFD and Korman shoreline electrofishing for sunfish, walleye, bass

Evaluating the Role of Aeolian Sand in the Preservation of Archaeological Sites, Colorado River Corridor, Grand Canyon, Arizona: 2003-2006 Results. Helen Fairley presented work done by Drs. Amy Draut and Dave Rubin between 2003 and 2006. She advised that a lengthier presentation by the authors could be scheduled. She gave a PowerPoint presentation (***Attachment 3f***) and offered the following findings:

- High rates of aeolian sand transport appear to offset/limit gully erosion caused by rainfall.
- If open, dry sandbar area can be enlarged (using BHBFs and normal dam operations), aeolian sand transport to Modern Fluvial Sourced deposits should increase, especially during spring windy season.
- All sites are not equally affected by aeolian processes; location of sediment supply in relation to predominant wind direction is key.

Monitoring and Research Plan Update (***AIF-Attachment 4a)*** John Hamill's presentation focused on the background of the Monitoring and Research Plan (MRP) (***Attachment 4b***), its major elements, and revisions made in response to a minority report and AMWG comments received over the past six months. His presentation included the following conclusions:

- All issues raised in the TWG Minority Report were addressed by GCMRC and reviewed by the TWG.
- Additional issues raised by AMWG members have been addressed.
- Development of the MRP represents the successful culmination of a 2-year planning effort involving GCMRC, the SPG, the TWG, and the AMWG.
- An approved plan is needed to guide the research and monitoring program while the LTEP is developed.

Larry Stevens expressed concern that the MRP did not represent a true ecosystem approach. Mr. Hamill said that they would get closer to that goal through the emphasis in the MRP of working with the Science Advisors, bringing additional ecological expertise to GCMRC, updating the conceptual ecosystem model, and integrating the ecosystem approach into the way GCMRC does business.

Jan Balsom asked about the timing and organization of the LTEP and the MRP, and expressed concern that the MRP is almost independent of the LTEP EIS process. She asked how those become integrated since they are or should be the same thing. Mr. Hamill said they had hoped to have an all-encompassing plan that addressed the experimental elements of this program, the core monitoring element, and the research elements, but they could not accomplish that. Rather than give up on the MRP, they felt they should finalize the agreements in the core monitoring and research arenas, with a commitment that once the LTEP is done, they would amend the MRP to include those elements.

Clayton Palmer praised GCMRC for substantively addressing the minority concerns of the TWG and AMWG and demonstrating the capability of moving from a disagreement to a consensus.

TWG Chair Report (***Attachment 4c***). Kurt Dongoske reported that the TWG, by a vote of 8 in favor, 7 opposed, and 4 abstaining, passed the following motion: "The TWG moves to accept the revisions to the MRP and forward the revised MRP to the AMWG for approval." Because TWG members did not see the completed document with revisions, some TWG members were reluctant to recommend it to the AMWG. There were concerns expressed that the document lacked clear linkages between: (1) strategic science questions (SSQs) and the projects proposed within the MRP, (2) SSQs and the research information needs, and (3) between the MRP with the LTEP, particularly with regard to budgeting projects. On the other hand, many TWG members felt that the MRP is an evolving document, that it is subject to change over time as new information comes in, and that there was an urgent need to finish the MRP.

Stakeholders made the following comments:

- Randy Seaholm: We need a separate recovery program for HBC in Grand Canyon.

- Larry Stevens: An ecosystem historical review can help answer questions about the ecosystem so they do not perpetuate through time.
- Amy Heuslein: Consider recruiting a part-time tribal ecologist to address tribal monitoring.
- Dave Sabo: Can the HBC information be synthesized to help us with planning? (Mr. Hamill pointed out two major synthesis activities in the recent past: (1) the SCORE Report, which synthesized information collected over 13 years, and the MRP proposes to update that report every five years, and (2) the Knowledge Assessment Report, which identified what we know, where are the gaps, and how do we fill them. He said that he believed this is how science ought to be conducted: by beginning with a review and synthesis of the literature.)

MOTION: The AMWG recommends approval of the July 30, 2007, draft of the MRP (as amended) to the Secretary of the Interior with the understanding that it will be revised to reflect the results of the LTEP EIS once it is finalized. (Motion proposed by Dave Sabo and seconded by Bill Werner.)

After discussion, the group agreed by consensus to the following language:

REVISED MOTION: The Adaptive Management Work Group recommends approval of the July 30, 2007, draft of the Monitoring and Research Plan (MRP) to the Secretary of the Interior with the understanding that it will be revised to reflect the results of the Long-Term Experimental Plan Environmental Impact Statement once it is finalized, and with the following amendments:

- On Page 9: Replace, "In the FY 2007-2011 period, Grand Canyon Monitoring and Research Center (GCMRC) anticipates two additional Beach/Habitat Building Flow (BHBF) tests," with, "For budgeting purposes, in the FY 2007-2011 period, GCMRC anticipates two additional BHBFs."
- On Page 52: MRP language will be changed to clarify that "replication of the 2004 BHBF" refers only to that portion of the hydrograph used in the 2004 experiment consisting of the rising limb, peak, and recession.

Passed by consensus.

GCMRC's BHBF Science Planning Update (***AIF-Attachment 5a***) Ms. Burman reminded the group that last February, the Secretary's Designee suggested a process for approving a science plan for BHBFs and that process is underway. She asked GCMRC to present an overview of the draft plan, knowing that the TWG has not yet reviewed it and could recommend changes.

Mr. Hamill referenced the February 2, 2007 memo from Mark Limbaugh to the AMWG which stated, "In accordance with the AMWG's recommendation, staff at the GCMRC have been working since the December meeting to prepare a draft science plan regarding additional BHBFs. …it is my hope that we can work effectively together to have well-considered, approved, 'off-the-shelf' action plans to take advantage of these types of important research opportunities in the future." GCMRC took that as direction from the Department to complete the plan as quickly as possible. Mr. Hamill and Dr. Melis made a presentation entitled, "Beach Habitat Building Flow Science Plan Update and Future Steps (***Attachment 5b***), in which they summarized the sand mass balance in the system, the Science Plan, the comments and questions from AMWG and TWG with GCMRC responses, and AMWG decision points. Their next steps included a request for comments from AMWG on GCMRC responses to AMWG concerns, TWG review of the plan in early October, and, for early November 2007, a proposed AMWG approval of the Science Plan with a recommendation on a winter 2008 BHBF test.

Dr. Melis presented "Water Year 2007 Update on the Suspended-Sediment Flux of the Colorado River Ecosystem below Glen Canyon Dam" (***Attachment 5c***). He concluded with the following facts:

- Relative to October 1, 2006, there is most probably 1.5 million metric tons of new sand in upper Marble Canyon (river-miles 1-30)
- Relative to October 1, 2006, there is likely 250,000 metric tons of new sand in lower Marble Canyon (river-miles 30-61)

- Since October 2006, about half of the sand exported from upper Marble Canyon byapssed lower Marble Canyon (eastern Grand Canyon lost (erosion) a small amount of sand during this period ~ 75,000 mmt).

GCMRC distributed Table 2 from the draft Science Plan (***Attachment 5d***) entitled, "Summary of proposed studies and *estimated* costs associated with a future integrated beach/habitat building flow (BHBF) test" and offered to review it in detail.

TWG Comments on the Science Plan. Kurt Dongoske said TWG members' comments on the Science Plan were supplied to GCMRC before the TWG meeting, and GCMRC provided a response to comments at the TWG meeting. He offered the following TWG concerns:

- Narrow focus of the BHBF Science Plan (FY08).
- Need for a broader scope science plan for use in future.
- Does not address the number of BHBFs necessary to address science questions. (What do managers need?)
- No acknowledgement of negative effects of BHBF.
- Policy issues need to be resolved by AMWG.
- Disappointment with GCMRC responses (defensive and not collaborative).

He said the DFCAHG was tasked with reviewing the BHBF Science Plan and providing comments to the TWG prior to the October meeting. They are to focus only on the technical issues and leave the policy issues to AMWG. The Sediment AHG was tasked with reviewing the sediment portion of the Science Plan. Both Ad Hoc Groups will work with GCMRC to bring a recommendation to TWG in October.

In answer to questions, GCMRC staff made the following points:

- The findings in the SCORE report are different from our assessment of sand transport today. GCMRC had reported that sand entering the system under 8.23 conditions was leaving in the same year, and thought it was due to higher flows in the summer and winter months and possibly the experimental fluctuating flows during three winters (January-March), with below-average sediment inputs those years. For the first time since the 2004 experiment, we are seeing 8.23 hydrology with above-average sediment inputs. Since January 2005, the system has been quite enriched and it has remained so despite 8.23 operations, probably because of frequent and abundant inputs.
- Scott Wright is working on a shift rating rule curve model based on recent hydrology, and data are being collected now to allow him to do that. It shifts the relationship between sand transport and water discharge depending on how much sand is in the system. With more sand in the system, the transport rates are higher but there is also a lot of retention. We anticipate that it will be peer reviewed in the next few months and we will be able to use it for the LTEP EIS process.
- The estimated costs for the experiment do not include any cost of lost power revenues.
- AMWG should address the policy issues by November 2007 to be in advance of a BHBF test.

.: AMWG establishes the BHBF Policy Issues Group to identify non-technical issues with regard to BHBFs and make a recommendation to the AMWG at its next meeting with regard to how to address those issues. (Motion proposed by Nikolai Lash and seconded by Clayton Palmer.)

After further deliberation, the motion was revised to read:

REVISED MOTION. AMWG establishes the BHBF Policy Issues Ad Hoc Group to identify non-technical issues with regard to BHBFs (beginning with the list that was generated by the GCMRC at its August 2007 meeting), and make recommendations to the AMWG at its next meeting with regard to how to address those issues. For information sharing purposes, the AMWG invites a representative from each of GCMRC and TWG to attend meetings of this ad hoc group.
Passed by consensus.

Ms Burman requested that any AMWG member interested in participating on this ad hoc group submit their name to Ms Orton before lunch tomorrow.

Fiscal Year 2008 Draft Budget (***AIF -Attachment 6a and included the Draft FY08 Budget, Workplan, and Hydrograph***). The group agreed to the following budget discussion procedures:

1. Budget presentations (USBR, GCMRC, TWG Chair)
2. Proposed change to the budget received by the deadline of August 15 (GCT proposal for SASF)
    a. Discussion
    b. Consensus or vote
3. Other proposed changes
    a. Generate the full list before discussing any
    b. Discuss each one without decision
    c. Consensus or vote (show of hands) on each one
4. Consensus or vote (roll call) on a recommendation of a budget to the Secretary of the Interior

Budget Presentation - Bureau of Reclamation. Mr. Kubly said the total FY07 budget was $11 million, and for FY08, nearly $11.6 million. Power revenues contributed $9.7 million last year and about $9.97 this year. He presented two slides depicting the distribution of Reclamation's portion of the budget (***Attachment 6b***).

Budget Presentation - GCMRC. Mr. Hamill presented on the GCMRC portion of the budget (***Attachment 6c***). He noted that the budget has been reviewed several times with the TWG and other Ad Hoc Groups and program participants. The work plan emphasis was as follows:

- Transitional work plan until the LTEP is finalized.
- Continuation of FY2007 projects. [Resource monitoring and monitoring R&D, Core monitoring project review/approval (HBC, RBT), Tribal monitoring, Experimental fund ($500,000)]
- New Starts. [Grand Canyon archaeological site treatment ($300,000), Long term sediment storage monitoring project ($194,000), Study to evaluate the impact of flow regimes on aquatic food base and drift ($89,000)]
- De-emphasis: AMP effectiveness action plan.

Mr. Hamill's recommendations were:

- Approve the GCMRC FY08 workplan with proposed changes
    - WAPA/GCMRC: food base study plan revisions, +$17,000, to better complement existing foodbase project, test flows currently undefined
    - GCMRC: Inadequate time to plan basin-wide Science Symposium this winter – shift funding to Fall/Winter 2008-09
- Fund conceptual ecosystem model/ecosystem science workplan ($125,000) using any discretionary or FY07 carryover funds that may become available in FY08.

Budget Presentation – TWG Chair. Mr. Kubly presented the report because the TWG Chair was unavailable. He gave a presentation (***Attachment 6d***) demonstrating that TWG recommended continuation of MLFF and wanted the budget and workplan linked to the hydrograph. As chair of the Budget Ad Hoc Group, he said there might be a challenge this next year in developing the budget because of the timing of the LTEP. It depends on when they will know what the preferred alternative will be, how well the design is defined, and whether the Science Plan is ready. GCMRC is also working on the definition of core monitoring needs. He said he thinks it would be advisable to bring a proposal on how to address the LTEP disparity in the next budget cycle to the next AMWG meeting.

Proposed Change to the Budget Received by the Deadline. Nikolai Lash presented the proposed motion from Grand Canyon Trust for a hydrograph of Seasonally Adjusted Steady Flows (SASF). He said the SASF is a significant departure from the proposed budget but there are compelling reasons to do this. He reminded the members that during the development of the Glen Canyon Dam EIS and Record of Decision, USBR consulted with FWS on possible impacts to endangered species. The FWS stated in the 1994 Biological Opinion that the proposed flow (MLFF) would jeopardize the existence of razorback sucker and humpback chub. The Endangered Species Act (ESA) requires that when FWS makes a jeopardy determination, the proposed action (in this case, MLFF) cannot be implemented without also

implementing the Reasonable and Prudent Alternative (RPA) elements from FWS. Element 1A of the RPA requires SASF in low release water years (8.23 MAF), and despite many such years since 1994, SASF has not been implemented. A low steady flow was run for three months in 2000, but the SASF as required by FWS has never been done.

He quoted from the RPA: "A program of experimental flows will be carried out to include high steady flows in the spring and low steady flows in the summer and low steady flows in the fall during low water years to verify an effective flow regime and quantify, to the extent possible, effects on endangered and native fish … If the Service believes there is not sufficient progress, Glen Canyon Dam will be operated as SASF flows during spring through fall (April-October)." Mr. Lash said that in 2002, the Service did determine that insufficient progress was being made. He said that SASF should be run to gather scientific data on its impact on the river system and resources. He said that until the 1994 Biological Opinion is changed, it is still law.

Randy Peterson said there would be more discussion on this subject tomorrow when he addresses the LTEP. He concurred that the BO requires Reclamation to initiate formal consultation with the Service and that will be part of the EIS to be completed in October 2008.

MOTION: AMWG recommends that the Secretary implement Seasonally-Adjusted Steady Flows in WY 2008 as legally required by the 1994 Biological Opinion. The hydrograph will be based on the monthly release pattern in the graph titled "SASF w/ BHBF in March" which was distributed to AMWG members in the e-mail entitled "AMWG Proposed Budget and MRP Changes" on 8/16/07 (***Attachment 6e***). (Motion proposed by Nikolai Lash and seconded by John O'Brien.)

AMWG members expressed concern about the implications of AMWG members interpreting the law, and suggested the words "as legally required by the 1994 Biological Opinion" be stricken from the motion. Others expressed concerns about budget implications and the importance of science in the process. Ms. Burman asked that AMWG members review the motion this evening and prepare to discuss it tomorrow.

Other Proposed Changes. Ms. Orton said no other changes were received by the deadline, and asked if there were any other changes from AMWG members. She asked that if the change resulted in a cost increase, they include how that increase would be paid for. The following suggestions were provided:

- Conceptual Model: increase to $90,000 by eliminating Vegetative Transects. (Seaholm)
- Conceptual Model: add $35,000 by using a combination of carryover funds and the Experimental Flow Fund. (Stevens)
- Foodbase Study: increase by $17,500 by reducing the Experimental Flow Fund. (Palmer)
- DFCs Workshop: add a note on the Compliance Documents line item to include facilitation. (Balsom)
- Require the cultural resource component of the budget be reviewed by the CRAHG. (Palmer)

Public Comment:
Lynn Hamilton (Grand Canyon River Guides) urged the group to take advantage of the high sediment load in the river system to do a beach habitat building flow, and assured them that the public cares about the resources and wants action to protect them.

Adjourned: 5:45 p.m.

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Bob Snow, DOI
Brad Warren, WAPA
Scott Wright, USGS/GCMRC

Meeting Recorder: Linda Whetton, USBR

Introductions and Administrative Items: Brenda Burman welcomed the members, alternates, and members of the public. A quorum was established and attendance sheets distributed. She thanked GCMRC for arranging the meeting accommodations at NAU and for hosting the barbecue last night.

Public Outreach Ad Hoc Group (*AIF-Attachment 7, with PPT*). Sam Spiller, Ad Hoc Group Chair, said Reclamation is preparing additional outreach products, and he and John Hamill will discuss how other agencies can assist. Doug Hendrix presented the Phase II plan, products to increase the awareness of the Adaptive Management Program. He provided background information on the "Public Outreach Ad Hoc Group 2-year Informational Product Workplan Phase II Communications Efforts" and then gave a PPT presentation.

MOTION: The Adaptive Management Work Group recommends that the Secretary of the Interior approve both the continued deployment and maintenance of the Phase I public outreach campaign products (web site, displays, fact sheets) and the Phase II public outreach campaign that includes development of additional outreach materials, media support, public education, and events development and participation. (Motion proposed by Sam Spiller and seconded by Bill Werner.)
Passed by consensus.

FY08 Budget. Ms Burman said the budget discussion would continue at this point with the motion that Grand Canyon Trust proposed yesterday. Lash said he would remove the language that concerned members yesterday. He made the following statement for the record: "It's my interpretation of the law that seasonally adjusted steady flows are required to be run in 08 but that's my interpretation. I also want to enter into the record that the 1994 Biological Opinion was responded to by Charles Calhoun, Reclamation regional director, who said, 'We have received and reviewed the subject biological opinion dated December 21, 1994. It is our intent to implement the elements of the RPA.' As I make the change in this motion, my intent is not to project my legal interpretation on anybody nor is it my intent to have anybody's vote here reflect a legal interpretation. It need only reflect whatever context you deal with this motion."

REVISED MOTION: AMWG recommends that the Secretary implement Seasonally-Adjusted Steady Flows in WY 2008. The hydrograph will be based on the monthly release pattern in the graph titled "SASF w/ BHBF in March" which was distributed to AMWG members in the e-mail entitled "AMWG Proposed Budget and MRP Changes" on 8/16/07. (Motion proposed by Nikolai Lash and seconded by John O'Brien.)

During discussion, the following points were made:

- Larry Stevens: As another example of this program not incorporating scientific information and management, a synthesis was never done of the information gathered during the summer LSSF experiment in 2000, so we do not know whether steady flows promote native fish in the system. We need to fund the synthesis of that information, from other than our normal sources if necessary.
- Jan Balsom: I am obligated to do the best thing for the Canyon, and SASF has been recommended repeatedly over the past 10 years to benefit multiple resources. I do not think I have the information to decide whether this would be the best thing for the Canyon.
- Randy Seaholm: It makes sense to synthesize the data we already have. I have concerns about what SASF would do to power generation. If we reduce power here, it will be replaced with coal-fired generation. We need to consider global warming issues as well.

In answer to questions, Mr. Hamill said GCMRC had just completed a synthesis report on the physical aspects (sediment and temperature) of the 2000 LSSF test, and thought that a SWCA report was written on the biological component. The information has not been integrated in a conclusion report. Matthew Andersen said that while the long-term results have yet to be seen, the most conservative statement, drawn from peer-reviewed articles, is that the HBC population did not suffer from the LSSF. One could argue that they may have realized some benefit, because the population was well over 10,000 in the late 1980s and then dropped to about 5,000 in 2000, and at a minimum stabilized at that level after 2000.

Mr. Lash emphasized that LSSF is only one part of an SASF hydrograph, and that SASF are not only required but also should be done to resolve some of the questions about efficacy that people have

raised. John Hamill said that implementation of this recommendation would require significant adjustments to the workplan.

MOTION: The Glen Canyon Dam Adaptive Management Work Group recommends that the Secretary of the Interior implement Seasonally-Adjusted Steady Flows in WY 2008. The hydrograph will be based on the monthly release pattern in the graph titled "SASF w/ BHBF in March" which was distributed to AMWG members in the e-mail titled "AMWG Proposed Budget and MRP Changes" on August 16, 2007.

Stakeholder	Vote	Stakeholder	Vote	Stakeholder	Vote
AGFD	N	GCRG	Y	State of New Mexico	N
State of Arizona	N	Grand Canyon Trust	Y	So. Paiute Consortium	A
BIA	absent	GC Wildlands Council	A	FWS	Y
BOR	N	Hopi Tribe	absent	UAMPS	N
State of California	N	Hualapai Tribe	A	State of Utah	N
CREDA	absent	NPS	Y	WAPA	N
State of Colorado	N	Navajo Nation	A	State of Wyoming	N
Federation of Fly Fishers	N	State of Nevada	N	Pueblo of Zuni	N

Failed by a vote of 4 yes, 13 no, and 4 abstaining, with 3 absent.

The group discussed the other changes to the proposed budget put forward the day before, including one addition: synthesis of data from the 2000 LSSF experiment, including economic data. Mr. Hamill noted that the Science Symposium is scheduled for 2008, versus a suggestion made earlier to hold it in 2009. Since there are no budget implications, he asked if the members had any objections. Since none was voiced, the symposium will go forward as scheduled in the fall of 2008.

After discussion and a show of hands for each proposed change, Randy Seaholm moved to approve the budget with changes (below). Mr. Lash said he would abstain from voting on the motion because he believes the SASF should be done instead of MLFF, and his intent in abstaining was not to block consensus.

MOTION: The AMWG recommends that the Secretary of the Interior approve the FY08 Glen Canyon Dam Adaptive Management Program workplan and budget in the amount of $9,438,256 (details attached), and that WY08 be initiated with a Modified Low Fluctuating Flow hydrograph, with the possibility of a recommendation this fall for a WY08 BHBF, with the following changes:

- Add a note on the compliance line of the Bureau of Reclamation budget that facilitation for the Desired Future Conditions AHG will be supported from this line.
- Direct the Cultural Resources Ad Hoc Group to review the GCMRC Cultural Resources FY08 Budget.
- Add $100,000 for the Conceptual Model project described on page 194 of the workplan.
- Add $17,500 to the foodbase study per the recommendation from GCMRC.
- Add $100,000 toward a synthesis of the data from the 2000 Low Steady Summer Flows experiment, including economic data.

These additions will be funded first from the FY07 carryover, which is expected to be $200,000, and if needed, from the experimental fund, in an amount that will not exceed $60,000.

Stakeholder	Vote	Stakeholder	Vote	Stakeholder	Vote
AGFD	Y	GCRG	Y	State of New Mexico	Y
State of Arizona	Y	Grand Canyon Trust	A	So. Paiute Consortium	Y
Bureau of Indian Affairs	absent	GC Wildlands Council	Y	FWS	Y
Bureau of Reclamation	Y	Hopi Tribe	absent	UAMPS	Y
State of California	Y	Hualapai Tribe	Y	State of Utah	Y
CREDA	absent	National Park Service	Y	WAPA	Y
State of Colorado	Y	Navajo Nation	Y	State of Wyoming	Y

Federation of Fly Fishers	Y	State of Nevada	Y	Pueblo of Zuni	Y

Passed by a vote of 20 yes, 0 no, and 1 abstention with 3 absences.

Climate Change Presentation (*AIF-Attachment 8, with PPT*). Dr. Melis welcomed Dr. Roger Pulwarty to the meeting. He said Dr. Pulwarty was involved in the AMP in 1995 before the AMWG was officially formed, helping with climate related issues and integration workshops. Dr. Pulwarty gave a presentation on climate change and provided the following projections for future changes in climate:

- For the next two decades a warming of about 0.2°C per decade is projected for a range of SRES emission scenarios.
- Even if the concentrations of all greenhouse gases and aerosols had been kept constant at year 2000 levels, a further warming of about 0.1°C per decade would be expected.
- Earlier IPCC projections of 0.15 to 0.3°C per decade can now be compared with observed values of 0.2°C.
- By 2010-2039 year round temperatures are anticipated to be outside the range of normal variability

LTEP EIS Update (*AIF-Attachment 9, with Matrix*) Randy Peterson distributed copies of the Long-Term EIS – Matrix of Draft Alternatives and said it would be posted to Reclamation's website by close of business tomorrow, with a document describing the range and fluctuations for each of the alternatives and more detail on the non-flow actions involved.

He said the LTEP EIS process started last fall with four months of public scoping. USBR established a group of 16 cooperating agencies, reviewed public comments, and developed a set of alternatives for consideration in the LTEP EIS. He gave a presentation in which he said the purpose of the EIS is to increase understanding of the ecosystem and improve the status of resource conditions in Glen and Grand canyons, particularly those that have not responded as expected in the 1996 ROD. The resource focus is on the humpback chub and sediment conservation, and the goal is to increase the number of chub and to reverse the decline of sediment in the Grand Canyon, as well as develop definitive answers to core questions with regard to those resources. Mr. Peterson said they believe they have a range of alternatives that would lead to a variety of scientific approaches.

In answer to questions, Mr. Peterson made the following points:

- We decided to test the TCD with just two units because with the limited release capability of the current reservoir elevation projections, two units could provide warm water during the June-November period. After testing the two units, a decision would be made with regard to whether four units were needed. Note that the No-Action Alternative has a probability that the releases in the near-term future would be warm.
- The timeframe of the experiment is the same for all the alternatives to allow a more accurate comparison among them. We are considering a 10-year timeframe but this may yet change.
- DOI agencies were involved in development of Alternative 2 as a way to develop a middle ground alternative. They felt the steady flow testing would ameliorate some of the economic impacts to power generation, and the TCD was included as well.

Sam Spiller indicated his concern about warming the water because of the potential for piscivory of native fish by warm water fish, and recommended rearing facilities for native fish.

HBC Comprehensive Plan and Recovery Implementation Plan Update (*AIF-Attachment 10, with PPT*)

HBC Comprehensive Plan. Glen Knowles gave a presentation and said the TWG HBC Comprehensive Plan Ad Hoc Group had submitted their draft plan to the Science Advisors. He summarized their comments and said the committee found their comments very useful. The only changes they would not make are those that would not meet the charge given to them or for which they would not have enough money. He said their next step is to revise the plan with a response to comment document that will go to

the TWG. When the final draft comprehensive plan is completed and reviewed by the TWG, the AMWG's Ad Hoc Group for HBC Policy and Associated Implementation Concerns will make a recommendation to the AMWG with regard to which parts of that plan should be part of the AMP and which should not. The Grand Canyon HBC Recovery Implementation Plan would address the elements that are not part of the AMP.

HBC Recovery Implementation Plan. Sam Spiller gave a presentation on the lower Colorado River RIP. He said they would be looking to the AMWG and the MSCP to participate in the program. AMWG will need to determine how they want to participate. Some of the projects will focus on water quality and water quantity in addressing the upper part of the watershed. They also need to look at efforts by the tribes to increase humpback chub.

In answer to questions, Mr. Spiller said the following:
- We would like to see a broad representation of stakeholders involved in the RIP, and that will be needed to fund the project.
- The RIP will not be part of the LTEP.

Basin Hydrology (*AIF-Attachment 11, with PPT*) Heather Patno introduced herself as a regional hydrologist with the Bureau of Reclamation. She has five years of experience in Upper Colorado issues and came from WAPA to Reclamation. She gave a presentation depicting drought and precipitation information. Reclamation is predicting 81% of normal as the most probable inflow to Lake Powell, and that lake elevations will probably be higher this year than last year, when the inflow was 95% of normal. This is due to the large October precipitation event. The most probably runoff is 9.8 MAF, which suggests Lake Powell will rise with an 8.23 MAF release.

Non-Native Species Discoveries and Control Effects. Matthew Andersen gave a presentation (***Attachment 12a***) in which he reviewed the non-native species that we know are in the Grand Canyon Colorado River system, including *myxobolus cerabralis* (whirling disease), zebra and quagga mussels, crayfish, fish parasites (Asian fish tapeworm, anchor worm), and numerous types of non-native fish. For each of the species, he reviewed the associated control efforts and the risks involved. He provided copies of the following papers, 1) "Distribution and Abundance of Native and Non-native Fishes of the Colorado River Ecosystem in Grand Canyon, Arizona" by Owen T. Gorman (***Attachment 12b***), "A Dreissena Risk Assessment for the Colorado River Ecosystem" by Ted Kennedy (***Attachment 12c***), and "Dispersal of Nonnative Fishes and Parasites in the Intermittent Little Colorado River, Arizona" by Dennis Stone (***Attachment 12d***).

In answer to questions, Mr. Andersen said the following:
- GCMRC could be engaged in warm water non-native fish control and suppression efforts as outlined in the LTEP alternatives as early as 2008, with the pilot projects element in the FY08 budget.
- The long-term control plan for non-native fish would be finalized in 2010.
- With the exception of the Little Colorado River, the focus of GCMRC planning for non-native species control has been on the mainstem, not the tributaries. A recovery program would need to address the tributaries because the scope of this program is the CRE only.

Roles Ad Hoc Group Report (*AIF-Attachment 13a with Roles AHG Report*) Randy Peterson said he was seeking additional comments on the Roles Ad Hoc Group report because only five AMWG members and one TWG member have responded so far. He handed out the comments he had received to date (***Attachment 13b***) and asked that future comments refer to specific pages and paragraphs versus submitting redline/strikeout versions. He requested comments be sent to him by the end of September. He concluded with a PPT presentation ***Attachment 13c***).

Update on BHBF Issues Policy Group. Members should submit their name to Linda Whetton if they would like to be on the BHBF Policy Issues Ad Hoc Group.

Attachment 14: E-mail message sent to the AMWG and TWG on Nov. 28, 2007, transmitting the "Executive Summary: Science Plan for Potential 2008 Beach/Habitat-Building Flows Test at Glen Canyon Dam.

Attachment 15: E-mail message transmitting a letter to the AMWG members and alternates from Deputy Secretary Lynn Scarlett, dated January 15, 2008, Subject: Response to Adaptive Management Work Group Recommendations.

Attachment 16: Glen Canyon Dam Adaptive Management Program Budget and Annual Work Plan – Fiscal Year 2008, Final Planning Document Dated April 13, 2008

Public Comments: None

Adjourned: 3:05 p.m.

Respectfully submitted,

Linda Whetton
U.S. Bureau of Reclamation

General Key to Adaptive Management Program Acronyms

ADWR – Arizona Dept. of Water Resources
AF – Acre Feet
AGFD – Arizona Game and Fish Department
AGU – American Geophysical Union
AIF – Agenda Information Form
AMP – Adaptive Management Program
AMWG – Adaptive Management Work Group
AOP – Annual Operating Plan
BA – Biological Assessment
BAHG – Budget Ad Hoc Group
BE – Biological Evaluation
BHBF – Beach/Habitat-Building Flow
BHMF – Beach/Habitat Maintenance Flow
BHTF – Beach/Habitat Test Flow
BIA – Bureau of Indian Affairs
BO – Biological Opinion
BOR – Bureau of Reclamation
CAPA – Central Arizona Project Association
GCT – Grand Canyon Trust
CESU – Cooperative Ecosystems Studies Unit
cfs – cubic feet per second
CMINs – Core Monitoring Information Needs
CRBC – Colorado River Board of California
CRAHG – Cultural Resources Ad Hoc Group
CRCN – Colorado River Commission of Nevada
CRE – Colorado River Ecosystem
CREDA – Colorado River Energy Distributors Assn.
CRSP – Colorado River Storage Project
CWCB – Colorado Water Conservation Board
DBMS – Data Base Management System
DFCAHG – Desired Future Conditions Ad Hoc Group
DOE – Department of Energy
DOI – Department of the Interior
EA – Environmental Assessment
EIS – Environmental Impact Statement
ESA – Endangered Species Act
FACA – Federal Advisory Committee Act
FEIS – Final Environmental Impact Statement
FRN – Federal Register Notice
FWS – United States Fish & Wildlife Service
FY – Fiscal Year (October 1 – September 30)
GCD – Glen Canyon Dam
GCT – Grand Canyon Trust
GCMRC – Grand Canyon Monitoring & Research Ctr.
GCNP – Grand Canyon National Park
GCNRA – Glen Canyon National Recreation Area
GCPA – Grand Canyon Protection Act
GLCA – Glen Canyon National Recreation Area
GRCA – Grand Canyon National Park
GCRG – Grand Canyon River Guides
GCWC – Grand Canyon Wildlands Council
GUI – Graphical User Interface
HBC – Humpback Chub (endangered native fish)
HMF – Habitat Maintenance Flow
HPP – Historic Preservation Plan
IEDA – Irrigation & Electrical Districts Assoc. of Arizona
INs – Information Needs
IT – Information Technology
KA – Knowledge Assessment (workshop)
KAS – Kanab ambersnail (endangered native snail)
LCR – Little Colorado River
LCR MSCP – Lower Colorado River Multi-Species Conservation Program
LTEP – Long Term Experimental Plan
MAF – Million Acre Feet
MA – Management Action
MLFF – Modified Low Fluctuating Flow
MO – Management Objective
MRP – Monitoring and Research Plan
MSCP –Multi-Species Conservation Program
NAAO – Native American Affairs Office
NAU – Northern Arizona University (Flagstaff, AZ)
NEPA – National Environmental Policy Act
NGS – National Geodetic Survey
NHPA – National Historic Preservation Act
NPS – National Park Service
NRC – National Research Council
NWS – National Weather Service
O&M – Operations & Maintenance (USBR funding)
PA – Programmatic Agreement
PEP – Protocol Evaluation Panel
POAHG – Public Outreach Ad Hoc Group
Powerplant Capacity = 31,000 cfs
PPT – PowerPoint (presentation)
R&D – Research and Development
Reclamation – United States Bureau of Reclamation
RBT – Rainbow Trout
RFP – Request For Proposals
RINs – Research Information Needs
ROD Flows – Record of Decision Flows (from Operation of Glen Canyon Dam Final Environmental Impact Statement Record of Decision 1996)
RPA – Reasonable and Prudent Alternative
SAs – Science Advisors
Secretary – Secretary of the Interior
SCORE – **S**tate of the **Co**lorado **R**iver **E**cosystem
SHPO – State Historic Preservation Office(r)
SOW – Scope of Work
SPAHG – Strategic Plan Ad Hoc Group
SPG– Science Planning Group
SSQs – Strategic Science Questions
SWCA – Steven W. Carothers Associates
TCD – Temperature Control Device
TCP – Traditional Cultural Property
TES – Threatened and Endangered Species
TWG – Technical Work Group
UCRC – Upper Colorado River Commission
UDWR – Utah Division of Water Resources
USBR – United States Bureau of Reclamation
USFWS – United States Fish & Wildlife Service
USGS – United States Geological Survey
WAPA – Western Area Power Administration
WY – Water Year (a calendar year)

Q/A/C/R = Question/Answer/Comment/Response