Glen Canyon Dam Technical Work Group Meeting
October 2-3, 2007

Conducting: Kurt Dongoske, Chairperson

October 2, 2007
Convened: 9:30 a.m.

Committee Members Present:

Mary Barger, WAPA
Charley Bulletts, Kaibab Band of Paiute Indians
Kerry Christensen, Hualapai Tribe
Jonathan Damp, Pueblo of Zuni
William Davis, CREDA
Jay Groseclose, NM Interstate Stream Comm.
Rick Johnson, Grand Canyon Trust
Robert King, UDSR
Glen Knowles, USFWS
Dennis Kubly, USBR
Phillip S. Lehr, Colo. River Comm./NV
Ken McMullen, NPS/GCNP
John O'Brien, GCRG
Don Ostler, UCRC
Bill Persons, AGFD
D. Randolph Seaholm, CWCB
Mark Steffen, Federation of Fly Fishers
Larry Stevens, Grand Canyon Wildlands Council
Bill Werner, ADWR
Michael Yeatts, The Hopi Tribe

Committee Members Absent:

Cliff Barrett, UAMPS
Steven Begay, Navajo Nation
Christopher Harris, Colo. River Board of Calif.
Norm Henderson, NPS
Amy Heuslein, BIA
John Shields, WY State Engineers Office

Alternates Present:

Garry Cantley
Leslie James
Don Ostler

For:

Amy Heuslein, BIA
Cliff Barrett, UAMPS
John Shields, State Engineers Ofc./WY

Interested Persons:

Jason Alberts, DOI
Matthew Andersen, GCRMC/USGS
Glenn Bennett, GCMRC/USGS
Mike Berry, USBR
Shane Capron, WAPA
Lew Coggins, GCMRC/USGS
Helen Fairley, GCRMC/USGS
David Garrett, M^3Research (Science Advisors)
John Hamill, GCRMC/USGS
Barbara McKenzie, GCMRC/USGS
Ted Melis, GCMRC/USGS
Anthony Miller, Colo. River Comm./NV
David Topping, GCMRC/USGS

Meeting Recorder: Linda Whetton, USBR

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Welcome and Administrative. The Chairman welcomed the TWG members, alternates, and interested persons. Attendance sheets were distributed. Kurt announced that public comments would be taken in conjunction with individual presentations rather than at the end of each meeting day.

Approval of Draft Minutes from April 2-3, 2007, Meeting. Without objection, the minutes were approved.

Approval of Draft Minutes from June 25-26, Meeting. Pending one minor correction, the minutes were approved.

Review of Action Items. Kurt reviewed the Action Item Tracking Report (***Attachment 1***) and additional discussions on several of them are listed below.

Item 2007.04.2-3(3). Bill Persons asked why peer reviewing was important in April when the action item was established, but not now. He asked Mike Berry for further clarification. Mike said it was not important to peer review it and that's the purpose of the PA. He thought it would be very important for the results of the contractor's work on the treatment plan to be peer reviewed on an annual basis because that's the actual work product. Mike said the work would be based on the plan plus a lot of recommendations for the actual selection of sites. Out of the 54 sites, only four are going to be excavated this year because they only have $300K in the budget. The sites have been selected in conjunction with NPS and to satisfy WAPA's requirement at this point in time, they were only to go for that budget if sites were restricted to those directly affected by riverine processes. He's hoping that by next year he can convince everyone that an APE, according to 36 CFR 800, is determined by the lead agency in conjunction with the SHPO and that's what they did and so those sites that they identified are PA compliant. Because it's a $5 million project, John Hamill said not doing a peer review of the plan was a departure from normal protocols. Mike responded that NHPA is not the Grand Canyon Protection Act and its Reclamation's responsibility. He said some people who have read it offered constructive criticisms but generally found the document more that adequate. Mike said that before Don Fowler went on the river trip, he knew nothing about the archeology of the canyon so Mike sent him a copy of Zuni's work and he reviewed it. Even though it wasn't officially peer reviewed, it was seen by an outside source.

Kurt said that if the members had concerns about documents going through a peer review process, now was the time to discuss those concerns.

***C**: Reclamation would like to hear if that's important now rather than at the point of a budget consideration next year where you decide that if it hasn't been peer reviewed, that you would hold it differently than you would if it had been. (Kubly)*
***Q**: Was the treatment plan rewritten because I know there were a number of comments that were submitted on the treatment plan? (Barger)*
***A**: We are using the treatment plan as a base document and I'm incorporating any suggestions, improvements, etc., to the actual treatment plan that we're going to be building in consultation with the SHPO and will be preparing a memorandum of Agreement. Your considerations will be heard but I see no purpose in rewriting that base document right now. As far as peer review goes, the expertise for this particular canyon is found primarily in the agencies that have the most experience in it. He said an archeologist from the outside would not understand a lot of the issues and there are a lot of doctorates in the group capable of doing the peer review. (Berry)*
***C**: I do find peer review of a program of this magnitude and having the impact on this program to be very important and would like to move that this treatment plan is peer reviewed before it moves forward because it would affect the way I look at how projects factor in future budget cycles. If there are any projects that are going to tier off those other documents, I'd like to see those peer reviewed. (Johnson)*
***R**: If you're going to desire a peer review, let's be specific about which documents you want to review. There are several in the stages leading up to getting an MOA developed. There is the initial treatment by Navajo and Zuni. There is a modification we're going to make in the actual implementation of the treatment plan based on comments from other archeologists and other stakeholders. (Berry)*

Kurt said there are two treatment plans: 1) one produced by the Navajo Nation Archeology Department for the Glen Canyon Reach from Lees Ferry to Glen Canyon Dam, and 2) one for Grand Canyon which was developed by Zuni Cultural Resource Enterprise (ZCRE). The one addressed in the action item is the GRCA Treatment Plan which was produced by the ZCRE. He added that the documents have been submitted to the Advisory Council, the SHPO, and the members of the PA so they have gone through a peer review process to that extent but if the TWG wants peer reviews subjected to what GCMRC does, that's a different issue. If so, the questions would go to Dave Garrett and John Hamill as to whether or not they have funding to make sure that peer reviews happen in a timely manner. Dave Garrett said the Science Advisors are on a purchase order right now which has extension capability. Based on the proposal for this year's funding, Dave said it could've been included in that proposal. They would have to receive it in a particular period because the EIS is impacting their workload. He also said that several specialists could be brought in to review the plans. It could be done on the predicted costs for this year which he provided to GCMRC. Mike said he made the treatment plan available on an FTP site and sent that announcement out to everyone.

PROPOSED MOTION (by Rick Johnson): The TWG would like to see the archaeological treatment plans for GRCA and GLCA be peer reviewed through the Center peer review process.
Motion seconded: Larry Stevens.

***Q**: How many layers of outside review does this need? (James)*
***A**: That is exactly the NHPA process and is in accordance with Reclamation's compliance responsibility. If we want to add an extra layer of peer review into it, we'll be happy to do it but I would like a timely review because this is going to be a 5-year contract, one base year and four options, and the movement from year to year has to be done in an expeditious manner in order to get people in the field and write the resource design for the next year. (Berry)*
***Q**: You said you were going to use this base plan, the one that we just reviewed, would there be separate site specific treatment plans for each of the sites like the four that are going to be excavated this year? (Barger)*
***A**: No, the contractor in the RFP bid will propose a research design for the four sites we've selected and that will be the document going to the SHPO for review. In subsequent years, there is a line item deliverable for the contractor to make recommendations on which sites are next. We have to understand there is going to be ongoing monitoring and so we're going to deal with it as another static situation of sites that are out there but as some sites stabilize, they can go off the list, but as some sites erode they'll go back on the list. That's the best way to manage this program. (Berry)*
***Q**: You said you were going to focus on four sites that were clearly affected by dam operations, but it's my understanding that the GRCA treatment plan doesn't actually address that issue so how was that decision made? (Fairley)*
***A**: First, WAPA said they would not budget for it unless we restricted it for the first year and until we could convince you of the wisdom of our agreement with the SHPO so we agreed to keep it in the corridor where you could see the direct effects. We did this in conjunction with the Park Service which has been monitoring it for years and these are the ones that are going out, especially the one in GLCA which is in danger with the next BHBF according to the geomorphologist. So that's the selection process. (Berry)*
***Q**: What are the costs associated with the peer reviews? (Davis)*
***A**: If I use outside input, it's between $10-40K. If we come together as a group, it costs me a lot more money. By that, I mean if I have a meeting of the science advisors, the costs are in the upper end. If I don't have to have a meeting, it goes toward the lower end. (Garrett)*
***Q**: It seems that the work that's already been done covered technical, peer, legal and policy peer reviews, your review is going to deal primarily with the technical part of it, so it's not going to be a complete peer review; it's going to be a partial peer. You're not going to be dealing with policy or legal implications. (Davis)*
***R**: We'll deal with the technical research methodologies. (Garrett)*
***Q**: Does this report go to the In/Out Group AHG at some point to discuss funding that would come from this program as opposed to other funding that may come from NPS or Reclamation for other reasons? (Seaholm)*
***A**: It wouldn't pass any in and out muster because there is no hardline fund. The sites we'll be dealing with are negotiated APE sites between the lead agency and the SHPO. We don't know the difference between dam effects and environmental effects and so our position was in the best interest of the archeology of the GRCA to treat those sites that we see actively eroding. The Park Service has been documenting adverse effects for 10 years to get something done. If it doesn't pass muster, it doesn't pass muster. (Berry)*

MOTION: The TWG would like to see the archaeological treatment plans for GRCA and GLCA be peer reviewed through GCMRC's peer review process.
Motion proposed by Rick Johnson.
Motion seconded by Larry Stevens.
Voting Results: Yes = 11 No = 6 Abstaining = 3
Motion passes.

Item 2007:06.25-26(3) and **2007:06.25-26(4)** John O'Brien reported two items have not been completed: 1) Review of the Draft Report to the Technical Work Group of the Glen Canyon Dam Adaptive Management Program: Recommended Protocols for Core Monitoring of Sediment within the Colorado River Ecosystem Below Glen Canyon Dam, Part IV - Developing a Scientifically Based Long-Term Monitoring Plan for the GCDAMP, and 2) the Sediment Transport Modeling Review Workshop Review Panel Report probably won't be ready by the next TWG meeting. He asked GCMRC and the TWG if there was a preference for having one ready in December and one for March. John asked for sequencing guidance, not prioritization. Ted said the modeling work is something that they're taking on each year and evaluating the reviews has been done. They're developing a Statement of Work for FY08 so input on that is needed as soon as possible. The long-term monitoring recommendations that were discussed at the last TWG meeting were more or less

approved by AMWG in August but GCMRC still wants input from the Sediment AHG but those tasks are scheduled in FY08. He said the modeling would have priority at this point. Kurt said he would like to see the sediment modeling report review completed and presented to the TWG by February 2008.

ACTION ITEM. Dennis said he thinks at some point the TWG needs to ask what the function is of the reviews on products that have been finalized and accepted. He would like further discussion on this at some point in time.

Item 2007:06.25-26(12). Dennis said the TWG might consider passing a motion to advocate that that process be undertaken. Helen said that Mary Orton keeps referencing the revisions that were passed by AMWG at their August 2003 meeting as being the latest version but that information is not incorporated into the document that is in the 2001 document. There are changes in numbering of CMINs and wording of MOs. Dennis said that the decoupling of the document and having it in different segments is confusing but he thinks the revision process will not ensue until the AMWG agrees it's important to do. Bill Persons asked if it was possible to get the most current document so everyone is working from the same document. Dennis said that Linda sent out the newest version several months ago and it's been posted to the website. Refer to: http://www.usbr.gov/uc/rm/amp/amwg/mtgs/06dec05/Attach_02.pdf

MOTION: Move the TWG request the AMWG update the Glen Canyon Dam Adaptive Management Program Strategic Plan so that all revisions be consolidated and include updating the targets for the management objectives as they become available.
Motion proposed by Dennis Kubly
Motion seconded by Bill Davis
Voting Results: Yes = 19 No = 0 Abstaining = 3
Bill Persons (abstaining): I wasn't paying attention. I would like to see the motions projected on the wall.
Don Ostler (abstaining): I got here too late to hear most of the discussion.
Rick Johnson (abstaining): I got here too early to hear most of the discussion.

Update on Tribal Consultation Plan. Mike Berry said that in 2006 a group of the DOI agencies modified version 11 of the Hualapai Tribal Consultation Plan as it was written by Dean Suagge, Hualapai's attorney. They made significant modifications, reorganized it, and reduced it quite a bit. They gave it to the Park Service Regional Solicitor for review. He made very few comments and it was sent to the tribes for comment. On June 27, 2007, the group met after the TWG meeting to develop a consolidated tribal consultation response but unfortunately only Pueblo of Zuni and the Hualapai Tribe members were present. Mike Yeatts (Hopi Tribe) had submitted a lengthy list of comments so they opted to go through Mike's comments and incorporated as many as they could. They later included Hualapai and Zuni comments. That particular plan went back to DOI along with additional comments from Dean Suagge and Mike Yeatts. Mike said he sent the June 27th version to a committee of DOI people along with the Hopi and Hualapai comments. At this point in time, DOI is next to take action. There was a conference call held yesterday to discuss many of the issues and as a result Mike said he would synthesize the comments from Hopi, Hualapai, and many of the points that were brought up in yesterday's meeting and provide those to the DOI agencies. The plan would go through a solicitor again and back to the tribes again. He didn't know how long the process would take but he thinks that by early next year they may actually have a plan in place and ready for signature by DOE and all the tribes.

***Q**: When we had an early meeting on the Tribal Consultation Plan, we were participating as Energy since we have requirements for tribal consultation as well, but we haven't been attending any of these meetings so I was wondering when does DOE become one of the Federal agencies? (Barger)*
***A**: I don't know. Perhaps John Hamill can respond. (Berry)*
***R**: So far we've had one meeting and one conference call to talk about tribal issues amongst DOI agencies. I think the intent is to ultimately extend an invitation to WAPA to participate in that process but currently discussions are focused on making sure that all the DOI agencies are on the same page on certain issues before we do that. The intent is to engage WAPA in those discussions at the appropriate time. (Hamill)*

Kurt said the Tribal Consultation Plan has been in draft form for at least six years and asked when the other non-Federal stakeholders would be able to comment on it. Mike said he feels they're getting very close. He said DOI took the lead because they have compliance responsibilities for consultation. They intend to distribute the plan to the stakeholders as soon as it's an acceptable version. He thinks that should be done before the signatory issue resolved.

NEW BUSINESS

AMP Project Tracking Table. Rick Johnson said he feels there isn't enough information coming from GCMRC to the TWG. As such, he asked GCMRC to prepare a tracking system so that when reports are completed and submitted to GCMRC, TWG members can request a copy from GCMRC. He said that John told him that GCMRC already prepares a project tracking table (***Attachment 2***) internally. In looking at it, Rick said it meets his needs and doesn't think GCMRC needs to prepare a new report. John Hamill said they have project deliverable tracking system in place within GCMRC but it's not very user friendly so they've modified a format used by the Upper Basin RIP to make it a little more user friendly. He asked if the TWG would find the information useful as a planning and/or tracking tool.

TWG comments included: 1) that it should be a revolving table with things getting added/subtracted as needed, 2) track presentations made to the TWG, 3) provide FWS trip reports to the TWG and, 4) try not to create a huge paper distribution process for the multiple reports from the contractors.

Kurt said that since he didn't hear any objections for producing the table, it will be produced and modified as the document is used.

SCIENCE UPDATES

Sand Mass Balance**.** David Topping distributed copies of his "Summary of Water Years 2007 Sand Supply Below Glen Canyon Dam" PPT presentation (***Attachment 3a***). He provided the following sand supply summaries:

- Relative to October 1, 2006, there is between 1.4 and 2.6 million metric tons of new sand in Upper Marble Canyon (river-miles 1-30)
- Relative to October 1, 2006, there is between 160,000 and 360,000 metric tons of new sand in Lower Marble Canyon (river-miles 30-61)
- Little Colorado River added another ~300,000 metric tons of sand to Eastern Grand Canyon during summer 2007
- Sand supply in Marble and Eastern Grand Canyon is greater than it has been since at least 1998
- Presents unique opportunity for BHBF testing under high level of sand enrichment conditions.

Q*: What happened in the August 27-Sept 23 events? You said since October 1st. (Davis)*
A*: Those combined to supply an additional 300,000 to 500,000 metric tons of sand. (Topping)*
Q*: Do you expect this sand to stick around if we don't have the larger flows out of GCD caused by equalization? (Ostler)*
A*: We've learned that if you have flows like we've had over the last year, which are normal ROD operations without anything special done in terms of fluctuations, the system has been gaining. It is moving through the system slowly and so the combination of those flows with the above average inputs have resulted in the current situation. (Topping)*
C*: So the likelihood of an equalization release next year is very, very low so probably next year will be an 8.23 maf release as well? I just wanted to make sure that's clear. (Ostler)*
R*: If we continue to have this little activity out of the Paria which I doubt because it does end up being one of the more extreme years, and if we don't have accumulation in the system, it will slowly move through the system. But if we do equalization and as soon as you go above 8.23, the transport rates go up very quickly. (Topping)*
Q*: If you continue with your MLFF ROD flows now, minimum flows to begin with, without any further input from the Paria, how long are we talking about? Is this amount that's there likely to stick around or is it going to actually continue to bleed away until there's nothing left of it? (Davis)*
A*: Yes. It's moving through the system. You will have a very large pile in Marble Canyon and that pile is decaying over time and is moving downstream. I can show you more on the poster. (Topping)*

***Q**: If you're given quantitative estimates of the amount of water that would actually be passed through, do you have the modeling capability to say what the likely effects of those flows would be? (Kubly)*
***A**: Scott Wright has taken the lead on a model which is a combination of theory and parasitism for this system which allows rating curves to shift up and down as production of how much sand is in the given reaches. If you have more sand in the reach, the transport relation, i.e., rating curve between discharge and sand transport shifts on and erosion shifts down. (Topping)*

GCMRC Culture Research and Development Project. Helen Fairley said it might be useful for the TWG to get an update on this project since it seems to bring a lot of attention from the AMWG and other venues but she wasn't sure if they were aware of what's been happening and where they're going with it. She gave a PPT presentation (***Attachment 3b***).

***Q**: What's the status of the HECRAZ model for flow data? (Barger)*
***A**: The development and completion of that report was funded in 2007 and Chris Magirl, who was a lead on this with Bob Webb is to hopefully have a draft report into USGS colleague review before the end of this year, have it approved during the wintertime, and the publication available shortly thereafter. (Melis)*

Mechanical Removal of Nonnative Fishes from the Colorado River within Grand Canyon. Lew Coggins passed out copies of his "Mechanical Removal of Nonnative Fishes from the Colorado River within Grand Canyon" PPT presentation (***Attachment 3c***). He said it would be an overview of what they've seen thus far. They're on track with preparing the final results of the project and have it available as an open file report in late December. They haven't had the peer review for a lot of the work. He provided the following conclusions:

- Non-native Removal Efficacy
  - Mechanical removal appears to be an effective way to control salmonids in the mainstem Colorado River
    - Rainbow trout abundance reduced to near target level (<10% original abundance) in 2005 and 2006.
    - Catch composition (by mass) of non-native fish reduced from >90% to <40%
    - Catch probability ~10-20% / pass
    - Low apparent immigration rate in 2005-2006.

- Native Fish Trends
  - Relative abundance assessments (catch-rate) no substitute for mark-recapture based stock assessments to determine recruitment trends.
    - Assessment of 2003 cohort will require 2007 and 2008 monitoring data.
    - However, there have been large increases in juvenile humpback chub relative abundance. Additionally, flannelmouth and bluehead sucker displaying overall positive trends in relative abundance.
    - Relative influence of non-native fish versus temperature still unknown.

***Q**: You had another reach that you studied and we haven't seen those results incorporated into this. Will they shed more light on the story? (Stevens)*
***A**: Not particularly. The catches are much smaller down to Tanner.*
***Q**: The reach around ___ murray? (Stevens)*
***A**: I'm not real comfortable talking about this because I'm not quite done with that assessment but we see the same kind of trend in catch rates, non-native fish, and RBT mostly. Our initial mark recapture estimates of abundance in that reach, and I don't have them done past September 2005, is that we see those kind of declining trends in non-native fish after the big flooding events out of the Paria that took place in 2004. It seems fairly punctuated that after those events we ended up seeing fewer RBT in that reach. As far as native fish captures, we didn't sample like we did downstream. We saw a few flannies. I think there may be one record of a juvenile HBC caught in that reach. The backwater data would suggest that there are juvenile fish appearing in that reach more regularly than in the past but the bottom line is it appears as though that kind of density of non-native fish in that reach declined through time and I think that helps to explain the declines in immigration rate into our removal reach. (Coggins)*

***Q**: The temperature is higher than in 2005 when it really peaked but then it only peaked at 17 and that's far from being an optimal temperature for rearing. I wonder about the role of temperature if that's the case, if it's still higher than maybe over a critical threshold? I think brown ones had it at around 18 degrees for successful rearing. Is there a relationship to the numbers you're finding in the mainstem and what's being found in the LCR? Is this really an increase in the population or are you seeing more in the LCR fish in the mainstem with these slightly elevated temperatures? (Johnson)*
***A**: Catch rate metrics in the LCR aren't very good. The conditions there influence catch rates and capture probabilities of the hoopnets used in there so much. I wouldn't even want to look at those trends very much. As far as the abundance estimates the FWS has put out, they're not showing any large increases in the numbers of fish between 150 mm and 200 mm in the Little Colorado over the same time period. However, a preliminary report and personal communication with Randy Van Haverbeke, looking at 2007 data, suggested the abundance estimate for 2007 may be quite large but I haven't seen that data in its entirety so I don't want to speculate anymore on that. (Coggins)*
***Q**: The agreement in the TWG to terminate mechanical removal was contingent upon updating and looking at changes and perhaps reinstituting at a later date. You're showing the details of your curves to be a potential resurgence in RBT, cyprinoids coming on, and the appearance of smallmouth bass. I just wonder what your comfort level is that we have a monitoring system that allows us to get that feedback and make those determinations. (Kubly)*
***A**: I'm certain that the level of effort we had this year is not going to detect the changes in species composition in relative abundance of various fishes when we had mechanical removal ongoing. The notion of when to stop doing this or when to reinitiate it is a tough question because in a sense it almost has to be looked at from a risk perspective. You have to deal with that risk perspective because you'd like to see these positive trends continue and is it worth the risk that they will continue if you stop mechanical removal for a long period of time and what are the tradeoffs and what other program objectives are you not going to be able to achieve? Another thing we could consider is to actually launch one full-on mechanical removal trip every year and use that to both estimate abundance of non-native fish in that reach to the extent possible, get a pulse of what the juvenile native fish are doing in that reach, and knock those fish back a bit in the process and try to alleviate that risk. (Coggins)*

FY08 Socio-economic PEP Update. Helen Fairley provided an update on the Socio-economic PEP (***Attachment 3d***). She said that last spring they tried to get things back on schedule. They held a workshop and reviewed the CMINs for vegetation, terrestrial resources, trout, and socio-economic issues and are planning to hold another workshop this year. She said comments were due back by May 7 but those received weren't substantive enough to make changes to the report. The plan now is to hold another socio-economic PEP in April 2008. Details should be available later this month.

Sonic Tag Project Update. In cooperation with their colleagues at AGFD, Matthew Andersen said they combined two trips, the non-native pilot project and the testing of the sonic tags. He gave a presentation (***Attachment 3e***) and provided some preliminary results from this past summer.

***Q**: The use of the tags will allow you to locate where the fish are and then essentially you would be able to go there and trap them? (Stevens)*
***A**: We think that would be one advantage to start targeting habitats that are likely to yield these individuals or this species. Some tracking methods like the hydrophones works well. There is a concept known as the "Judas fish" in which we track one or more individuals in hopes it will lead us to schools of their cohorts and allow us to target removal efforts more effectively. (Andersen)*
***Q**: Matt, I grew up in Iowa on the Des Moines river and fish below a dam of limestone and where we caught channel catfish was usually in deep holes. Are you saying that you think that all channel catfish reside along the shores or that you're just not detecting them in the deeper water? (Kubly)*
A: This is where we were detecting them. Is that the limits of our equipment or where they're really living? I think that needs further testing. (Andersen)

TWG Recommendation to the AMWG on technical sufficiency of the BHBF Science Plan (*Attachment 4a*) including the scope of studies to implement the next BHBF test. John O'Brien reported on the meetings held by the Sediment AHG. They went through the BHBF Science Plan fairly thoroughly and had quite an overlap with the DFCAHG. There were a number of formatting issues but they didn't find substantive, technical deficiencies. They felt that technically it was pretty clear. Mary Barger added there was some disagreement in the group on how technically adequate it was but that only some comments focused on rewrites and needing additional information for clarification. John hopes to get a finished report out to the TWG that would summarize their review. He thought it was safe to say that the

comments ranged from a list of things that need to be looked at to "you're doing a good job." There was a wide range of opinions on the ad hoc group. He will provide those comments to GCMRC and probably combine those with the DFC AHG comments and see how much of those are duplicates. He said one big question that came up was: "Is this BHBF science plan meant to be the plan for the next BHBF or is it to be an all encompassing umbrella plan for all BHBFs? He wasn't sure that the Secretary's Designee was clear on that in saying that a BHBF plan has to be on the shelf. He asked if they needed a BHBF plan for current conditions or for a range of conditions? The Sediment AHG also discussed whether they should be looking at strictly the sediment part of the BHBF or if the DFC AHG would pick up on issues of monitoring for biological things -- terrestrial, HBC, or other things like that. To that end, they tried to focus on the sediment portion of the plan.

Bill Davis requested that since the Sediment AHG is under the TWG, the report should be sent to the TWG before it goes to GCMRC. John concurred and said he would e-mail the report to everyone.

ACTION ITEM. Once the Sediment AHG has finalized their review of the BHBF Science Plan, John O'Brien will e-mail the report it to everyone.

***Q**: There was one other concern we discussed and it almost became a policy question. If we run a BHBF now, how would it affect the studies associated with an LTEP? If you initiated an LTEP, what is that going to show up in terms of the effects of study if you can't see the results of a BHBF for 1-3 years? That didn't come off in terms of having of trying to have a better understanding of when to run a BHBF in terms of the LTEP. (Barger)*
***Q**: Was there any resolution on that? We have a good cause for a trigger this next spring for a BHBF and that will be a discussion we take up during this meeting. The learning from BHBFs is pretty formulaic and the questions pretty well laid out. The LTEP may expand those but the details in learning from having BHBFs is on a track of its own. (Stevens)*
***R**: I would say that issue wasn't resolved. It was discussed by the DFCAHG in terms of how that should be addressed and we didn't know if it should be part of Reclamation's evaluation of the LTEP for the EIS or if there should perhaps be a white paper of what would be the effects to the LTEP studies of having a BHBF right before the LTEP is initiated. We understood there could be effects to a lot of different resources and if you stop MLFF and do something different, is that an issue? We're not qualified to make that determinatio and feel GCMRC or Reclamation should be looking at that. (Barger)*
***R**: There is no guarantee that LTEP will remain on schedule and at the last AMWG meeting there was no clear statement that we couldn't have a BHBF during the LTEP and to some reason not to mention the Grand Canyon system appropriately while LTEP decisions are being made. (Stevens)*
***Q**: Did your group try to establish or determine the goals for sediment? One of the thoughts is that we want to rebuild and maintain sandbars and that's a very vague goal because we don't know what level we want to build to and we don't know how much to maintain that level. Did you discuss that at all in terms of where you want to go with this? If we're going to go out and try and do an experiment to try and achieve a certain hypothesis about wanting to rebuild the sand to a certain level, it seems to me that we would like to know what that level is in order to try and do the experiment to see whether we achieve it? (Davis)*
***A**: No, we didn't look at that. I thought of that as more of a management goal. It was discussed briefly. Do we want to say we want to restore it to 1965 levels or are we looking at 1983 levels? We were trying to look at the BHBF to see if it was technically sufficient for GCMRC to say a BHBF, given these antecedent conditions at this time, will create this effect. That's kind of an overarching goal of the whole program to see if the sediment can be managed to some level but that's almost a policy decision. Do we want to manage to 1492 levels of sand or 1868? We didn't spend a lot of time on that. (O'Brien)*
***R**: I just don't see how you can design an experiment if you don't know where you're going with the experiment and what you're trying to achieve. (Davis)*
***C**: My comfort level is that we know which direction we have to go and I think we know that one BHBF isn't going to necessarily get us too far. I think the risk of over shooting how much sediment we want in the system is pretty minimal. In many ways it seems to me that until we get to the point of saying can we even maintain a positive or neutral mass balance of sediment in the system, the question about how much further we want to go beyond that is not particularly pertinent. (Johnson)*

Desired Future Conditions AHG Report. Ken McMullen said he was on the Sediment AHG as well as the DFCAHG so he felt there was good coordination between the two groups with some overlap. The DFCAHG decided they would focus more on the non-sediment related resources and tie in with what the Sediment AHG had worked on so that's how they went about developing the report, "DFC Ad Hoc Group Progress

Report and Recommendation on Technical Adequacy of the GCMRC BHBF Science Plan" (***Attachment 4b***). However, he said he would work off the "DFC Ad Hoc Group Summary Report to the TWG" (***Attachment 4c***) for today's discussion. Their schedule from now until November 6 will be to continue working on agreements for sediment and HBC desired future conditions and ultimately bring those to a workshop scheduled for November 6-7 in Phoenix. They would like to have members of the ad hoc group participate in that workshop. The initial thought was to have one member from each of the ad hoc agencies that are representatives and they could bring an alternate or somebody that would assist them during the workshop. Ken said the goal of the workshop is to settle on desired future conditions for HBC and sediment as well get some target levels for those two resources and present that information to the TWG at the December meeting.

Ken directed the members to look at Appendix A in the larger report. He said the DFCAHG is going to coordinate on the management objectives and see if they can get some correlation on those. They haven't agreed on the full list or the way the DFCs are presented. Overall, they felt the plan was 90% completed with the only remaining issues around budget and how to trim it to focus more on the sediment-related resources and future resource studies for HBC, riparian function, etc.

Ken said that when the report is turned over to the TWG in early December, he will complete his assignment as chair of the DFCAHG and that Mary Barger and Larry Stevens may continue on as co-chairs. He said the "**DFCAHG recommends: To not accept the plan as presented, but with slight modifications of the plan as listed below, the ad hoc recommends the plan to be technically sufficient for use in planning a BHBF test for 2008**." He offered the following recommended modifications to the plan:

1. Limit the BHBF test studies to answer short-term **sediment focused** resource questions like:
    - With sediment conservation and use, can enriched conditions successfully build target beach and near shore and backwater habitat?
    - Does the sediment trigger volume provide enough sediment into the river to create needed camping beach and habitat restoration, and meet longer-term maintenance requirements?
    - Does the BHBF successfully develop the near shore and backwater habitat?
2. What are the flows necessary to accomplish successful beach, shoreline, etc., restoration to DFC levels?
3. What are the changes to the HBC population after the BHBF test (pre and post sampling efforts required;
4. A BHBF is a substantial perturbation to the system which may result in humpback chub mortality, changes in recruitment, and modification of habitat. What may be the impact of a BHBF test right before the implementation of the LTEP?
5. Assess the impacts of a BHBF test on other resources in the long term, identifying linkages to ongoing MRP and LTEP designed flows and studies (e.g., assess timing, scope, and coordination, etc., with ongoing GCMRC efforts as necessary to accomplish longer-term studies); and
6. Refocus and reduce the overall BHBF science plan proposed budget to just the topic studies listed above, logistics, etc., and move longer term studies of other impacted topics to a separate section (the appendix?). This section should address LTEP linked research studies, changes to MRP efforts necessary to answer the BHBF questions, and applicable tasks necessary to address the need to conduct multiple BHBF tests that reflect the priority of resources as recommended by the AMWG.

Ken said that rarely was their full consensus on all issues and at meetings the most they had was seven members present and the least was five members on the conference calls. He said it was a majority consensus on the recommendation but not necessary a whole consensus.

C*: From what I read the economic impact studies aren't going to be done and will be put off to the LTEP. My biggest concern is the timing and the economic effect on the Marble Canyon economy. If it's done in the spring or even late winter, as proposed, the economy at Marble Canyon will be severely impacted. I would not be able to support a BHBF*

any time until after February 15. I would really like to know whether the first or second week of February would be an adequate time to do it. (Steffen)
***R**: The timing of a BHBF is really critical to tamarisk termination. If you run a BHBF too far into the spring period, meaning mid-May or June, those are the wrong times to run a BHBF if you want to keep tamarisk from spreading. We also want to avoid unnecessary stresses on native species and on the recreational community. There are many questions remaining about BHBFs that we haven't really started to tackle. (Stevens)*

Kurt asked the TWG if they had any questions about clarification of the ad hoc groups' positions. He asked if the Sediment AHG was endorsing the recommendation of the DFCAHG or had they reached a decision independently. John O'Brien said they might be able to convene the group tonight if people were available but at this time they didn't have a recommendation. Kurt said it was his understanding that both of the groups were to come back to today's meeting and provide the TWG with their recommendations on the technical adequacy of the science plan in order to make a recommendation to AMWG regarding the BHBF Science Plan. He said there was a recommendation from the DFCAHG and wondered if that influences how the TWG wants to proceed with the issue. The TWG raised the following concerns:

C: Since the AMWG probably won't meet until January 2008 and the TWG has a meeting scheduled for early December and John proposed that we would have a recommendation by then, I think there would be time to make a recommendation to TWG for the first week of December in order to get something to AMWG in January. (Barger)
***R**: If that's what we're going to do, then I think we need to ask GCMRC if there are changes recommended to the science plan and are they going to have the time to deal with those? (Dongoske)*
***R**: The Center was asked to prepare an off-the-shelf science plan to take advantage of an enriched sediment conditions in the river. We need a decision as to whether or not we're going to do a BHBF sometime in November or early December in order to arrange the logistics and to do it in a timely manner that would address concerns Mark raised about the timing. If we wait until January, we're up against the wall in being able to pull off a credible study. I don't know where the word is coming down that we're not going to have an AMWG meeting until January. I know how it works and if the AMWG meets in January, then it goes to the Secretary, and then the Secretary has to look at it for another 30 days and pretty soon we're into February and March and we're still waiting on whether it's going to be done or not and the opportunity has gone by. I feel an obligation to deliver a science plan to the Secretary within the time frame so a decision can be made based on the comments from today's meeting. It's my intent to send the science plan to the Secretary. (Hamill)*
***Q**: It wouldn't be unusual for the AMWG to have a conference call in mid-November to adopt or not adopt the TWG's recommendation on the science plan. Given the modifications to the current science plan that we recommend, and if the Sediment AHG can join in this, could those minor changes be made so we could get the plan back to us by the end of the month for perhaps a one-week review and then gain acceptance from our ad hoc groups? (McMullen)*
***A**: Our intent today was to take the comments from this meeting and that there was agreement on those comments to provide to the plan. I see a lot of the comments that came out of your group and those questions related to priorities and which studies do we want to do and what's the scope of the study. It's a complete package as we presented it. If this group recommends that you just focus on study one, the sediment and HBC aspects of it, it gets broken out so that you can find those elements and figure out what the costs are and say this is the part of the plan that we recommend be implemented. At the December 2006 meeting we went before the AMWG with the science plan that focused primarily on the sediment component and I got beat up pretty bad because we didn't have a plan that addressed foodbase, impacts on trout and HBC, and the list of concerns that were documented in that meeting was to develop a science plan that would be responsive to the comments that came in from the AMWG. I feel like we've gone full circle on this where now people are saying "no, we just want a basic, bare bones, stripped down version of a science plan." I'm reluctant to go back to the AMWG with a stripped down plan. I'll present them with the whole plan and if you want to recommend that only portions of it be presented, that's your prerogative but I think we can meet those needs in a way that still preserves the overall scope of the proposal and then you provide your recommendations to what aspects of the plan you think ought to be implemented. (Hamill)*
***Q**: I'd like to make a couple of comments, one representing Cliff who is on the DFCAHG. I think Ken fairly characterized the discussions that the ad hoc has had but I would like to say that the resultant DFCAHG recommendations aren't quite as strong as some of the concerns we had as to the technical sufficiency of the plan. I thought the plan was going to be revised based on the comments that have come in so far and I also thought that based on the direction from the AMWG, the policy issues group was going to have input to a revised plan before it was completed. Am I wrong on those two pieces? I know Larry has started the policy issues group dealing with some of the questions related to this but John if you're saying that you're going to take the plan based on what you hear today and send it to the Secretary, where do the policy issues fall out? (James)*

***A**: My sense is that those are on a separate track in that there was no specific timeframe agreed to by the AMWG as to when those issues were resolved. It's not within GCMRC's purview to address the policy issues and that's why we remanded them back to the AMWG with the understanding they were going to address them. If the AMWG wants to put the science plan on hold until that's done, that's their prerogative and if once those issues are resolved that has implications, we can come back and revise the plan but I think we're producing a plan based on what we know today and recognizing there are uncertainties about desired future conditions. There are uncertainties about funding, relationships to the LTEP, legal issues, and a host of things which may or may not get resolved any time soon. As far as the technical issues go, we'll do our best to address those in the final version of the plan. We're not going to just take this plan, put a new cover on it, and send it forward. If we hear some good technical comments that we can address through a revision, we'll do that. The problem is there are a lot of individual comments and it's difficult for us to and address all of those to everyone's satisfaction here. (Hamill)*
***R**: I just thought that that was part and parcel of having a science plan that would be acceptable to this program and included those elements. I may be wrong and it may be a question for the AMWG to consider but I thought I would at least provide my perspective on what was suppose to happen from the discussions last December at the AMWG. I'll set that aside. Let me address one of the points Ken brought up as to the DFCs because they are two separate things. I think we have some inherent conflicts with regard to: Are these DFCs for the Park, or are these DFCs for the LTEP, or are these DFCs for this program? I appreciate the Park Service putting their DFCs on the table for Park resources but again my interpretation of direction was to develop the DFCs for the goals related to this program and they may not be the same DFCs quantifiably or otherwise that the Park may have. I think the Park would need to address those through their management plan but for DFCs for this program, the first of which we were told were to look at HBC and sediment, they ought to be tied to the goals of this program and they may or may not always be coincident with the Park goals. The Park DFCs do not have a power goal because your comment in the appendix is that power is not a Park resource but there is a clear goal for this program for the power resource. (James)*
***C**: John, in response to a couple of things you said and I've been trying to sit in on the DFC for the BHBF as well as the sediment for the BHBF. Some of our comments went on board to have some sort of prioritized list of projects and when we looked at the 2003 BHBF plan that was done in that plan. Also, we were looking at some of the changes proposed from the 2003 plan to this plan and one of our questions was why aren't you going to do remote sensing for this BHBF and the answer was you are but a year later because you learned to do it differently based on the 2004 BHBF so we asked to include some of that information in the plan on why are you making modifications to this plan as opposed to the one that one done in 2003 based on your findings of 2004. You don't have to write up a full analysis of what you found on the 2004 BHBF but at least a clarification for changes and then put together a priority list because you did do it for the 2003. Those were some of our comments and they could be substantive in terms of change. Some of that was done in the 2003 and then the last comment was we noted in the 2003 plan, they were hypothesis-driven. Each of the proposed projects had a hypothesis. I know you're trying to address all of the AMP issues related to strategic science questions, and CMINS, and MOs, and INs, but as a result, the hypotheses were sort of glossed in that because they tended to be more generic to the AMP rather than specifically to that piece of whatever is being proposed for the BHBF. (Barger)*
***R**: With respect to adding clarification about overflights and when we would do one, I think those are the kinds of changes we could make if that would help address your concern. With respect to priorities, we had expected that this group would set some priorities. We proposed a range of studies that could be done. We believe that given that we're trying to take more of a holistic ecosystem approach given the concerns that we've heard in the past about the issues related to a BHBF, it makes a lot of sense to do this as a package deal and so that's why we came forward in the spirit of a more integrated science approach to present it the way we did but clearly if this group feels that there are priorities that could be one of the things done here today, the need to do and the nice to do things. We don't have a foodbase program. We don't have monitoring programs necessarily timed with this kind of an event that would allow us to specifically address what the effects of a BHBF would be on some of these other resources and that's why we proposed them. In the monitoring programs we have in this proposal are in fact built into this. If we use that as a baseline and we added to it, it's not like we're trying to duplicate what we're doing through the monitoring program. Monitoring is fundamental to these studies. I'm confused about hypothesis because we've clearly defined the hypotheses that would be tested in each one of these studies and those were pretty well laid out in the text and the table of the BHBF Plan that we built the studies around. We need to have more discussion about that. (Hamill)*
***R**: I want to respond to the question earlier about who these DFCs are for. These were proposed about one and a half years ago. They were definitely geared to the Park because it's our feeling that the DFCs answer some critical questions or needs of the AMP program through one or more of what we're trying to do to define the AMP program and what target resources and conditions meet the intent of the GCPA. These DFCs give the AMP program some direction on how we feel or what we think are DFCs to meet the intent of the GCPA as well as the define our own policies that require us to look at restoration levels, etc., for the Colorado River ecosystem. They are developed for the Park with the intent that they can be utilized to help this group define how it's going to meet the intent of the GCPA*

relative to GRCA National Park resources and GLCA as well. That's how we went in and provided these DFCs initially to this group. (McMullen)

TIME CHECK: Kurt said he wanted the TWG to spend the remainder of the time focusing on the BHBF Science Plan and specifically those technical aspects of the science plan that deal specifically with projects that are necessary. He asked if they wanted to prioritize them or if there are projects that can be pared back to give the Center recommendations or advice on specific aspects of the science plan. When he read the recommendations from the DFC AHG, he felt they were a higher level of recommendations regarding doing BHBFs and not specifically focused on the technical aspects of the current science plan as before. He asked for specific comments regarding the technical aspects of the science plan so they could be listed, addressed, and used to formulate a recommendation to the AMWG.

Kurt captured the following concerns and said he thought the group could categorize some of their concerns:

- native fish displacement, ESA NEPA compliance
- the timing of the flood with respect to its impact on HBC
- sandbars - what are the negative and positive effects throughout the system of a BHBF and where the sandbars are located, and how does that affect the overall balance throughout the system
- HBC monitoring – is it adequate? Focus on recruitment, mortality, and habitat and what are the impacts?
- Nearshore habitats
- Sediment questions
- Timing for HBC and habitat – when is the BHBF run?

Ken said that a lot of the above concerns were discussed and reviewed in the ad hoc groups but that there were a couple they felt GCMRC should address in the revised plan.

John said they received about 250 comments and responded to those comments in writing in an extensive table that was provided to the ad hoc groups and to the TWG. He didn't know how many people had read those responses and that that might be the first place to start. He didn't know if it would be productive to hash the additional concerns due to the time remaining in today's meeting. He said the general theme he was hearing was that the scope of the science plan is too broad and too expensive.

Kurt asked if the group was ready to make a recommendation on the technical aspects of the science plan. He advised that they're not making a recommendation on whether or not the science plan is implemented in 08 but just addressing the adequacy of the science plan. If they felt the issues were important and needed to be incorporated more effectively into the science plan, he asked for suggestions on how to proceed further. He also advised that if the TWG was going to make a recommendation to the AMWG about accepting the science plan for a BHBF and putting in recommendations for revisions, they need to be very, very specific about what those recommendations are and identify the target projects.

John Hamill said there is an appendix in the current science plan that lists the AMWG's concerns raised at the December meeting. There were ten of them, some of which were technical concerns, pros and cons of a BHBF; cost of a BHBF, how a BHBF would impact the LTEP, etc. He said GCMRC responded to those the best they could, recognizing that they were beyond their purview to address.

Dennis suggested looking at Table 2 which is a summary of the proposed studies and estimated costs. Some of those studies deal with fine sediment and HBC. If they were to isolate those, identify whether they cover the subjects that are of concern here sufficiently, if they don't propose to add to them and at least have that part done, they would be closer to making a recommendation.

It was decided the Sediment AHG and the Desired Future Conditions AHG would meet tonight and be prepared to make a recommendation at tomorrow's meeting.

Southern Paiuite Consortium Presentation. Charley Bulletts said he is the Southern Paiute Consoritum Director and has been working in that capacity for over a year. He has participated in several of the monitoring trips. He said his PowerPoint presentation (***Attachment 5a***) would provide a brief history of the Consortium. He also said a report, "Southern Paiute Participation in the Glen Canyon Dam Adaptive Management Program, A Ten-Year Review" (***Attachment 5b***) was prepared and he would provide that to Reclamation for posting on the AMP website.

Q*: You said on one of your bullets that integration of western and traditional knowledge was unsuccessful, would you elaborate on that and what would be needed to make it successful? (Johnson)*
A*: That's been a long term question and it's really hard we've had quite a bit of questions within our own society - how far do we go, how far do you go before cultural sensitivity to become involved in this ecosystem. We only have so much now but trying to get a scientist to understand and the only thing I've come up with is that we all have a concern and a care for that ecosystem. As a scientist and a Native American, that's the only thing right now I can see we all have concern about. We all want to help. We all want to do something for the ecosystem but what and that's where the door doesn't open. I said it before that science, from a Southern Paiute standpoint, in the Grand Canyon ecosystem can only go so far. Science is good and is the thing that needs to be done but from my understanding I thought science was a study of the impacts that go along with this ecosystem. Studies are good and if you look around now, we have all these natural disasters going on - earthquakes, eruptions, etc., - and my thinking along with other members in my program think say "when is the Grand Canyon going to get this massive sediment flow? When are we going to get our ten-year range?" Then, I'm saying "don't think that way because we're not Gods. As much as we want to get our little foot in the door to be like Wesley Powell and make these discoveries down the river and try to change something, it's tough. Life is tough. If we can sit here in a meeting and try to get something accomplished that's great.*
Q*: I had the same question. It's one thing to identify something that's not fitting the needs necessarily of the tribe but for us all to come up with a resolve as to how to rectify that is not as easy. It's much easier to identify the problem than it is to actually resolve. (Garrett)*
Q*: Following up on those questions a little bit, does the Consortium have a vision for what they would like to see the canyon look like or is more towards protecting the existing values with the dams in place?*
A: As I told someone on our AMWG river trip, my forefathers managed the system for centuries. Now, as of 1963 when the Dam was built, now it's up to you guys to manage what people at your age at that time thought the dam was going to do - provide power and all the other necessities that were needed at the time. They left it up to us in a memo to say let's let our kids deal with this. The Southern Paiute's concerns are for the plant life and animal life itself because water is a powerful, strong thing when you look at it. Water takes life and water gives life and it's people living within that ecosystem and our strong value is this more of respect to let the water flow and breathe because that to some of our cultures is like a cut in Mother Earth. It's a major cut that exposes all these different levels of what we refer to as flesh within her surroundings and sometimes we can't forget that there are other powers greater than us that will stop what we're trying to do. We think we're doing some good but in our Southern Paiute culture, that's one of our stories and I share that with you because in our culture from where the Colorado River leads down to the ocean all the way up, that's where Southern Paiutes came from. To us the river needs to be respected. We do an annual presentation to the river guides which is we always look forward to that because we know we can get the river guides to at least express some of our concerns as the Southern Paiutes and that's why we see the website being needed and to be accessible to the public. (Bulletts)
C*: I would like to highly recommend that anybody interested in the room in the problem of integrating tribal values into the scientific monitoring really needs to read the report that they turned out. It is an excellent history of the difficulty of communication between western scientists and the Southern Paiute Consortium's monitoring efforts. (Berry)*
C*: I would just like to reiterate what Mike just said. I thought that report was really though provoking. It was very well written and I would recommend all of you take the time to read it. It's much broader in some respects that just this monitoring program issue and it really deals with the whole integration within the Adaptive Management Program of tribal interests and values but it also addresses some of the broader issues that this group as a whole deal with. I thought it was an excellent piece of work. (Fairley)*

Kurt said tomorrow's agenda would be revised to accommodate some of the missed presentations at today's meeting.

Adjourned: 4:45.

Glen Canyon Dam Technical Work Group Meeting
October 2-3, 2007

Conducting: Kurt Dongoske, Chairperson

October 3, 2007
Convened: 9:30 a.m.

Committee Members Present:

Mary Barger, WAPA
Charley Bulletts, Kaibab Band of Paiute Indians
Kerry Christensen, Hualapai Tribe
Jonathan Damp, Pueblo of Zuni
William Davis, CREDA
Jay Groseclose, NM Interstate Stream Comm.
Rick Johnson, Grand Canyon Trust
Robert King, UDSR
Glen Knowles, USFWS
Dennis Kubly, USBR
Phillip S. Lehr, Colo. River Comm./NV
Ken McMullen, NPS/GCNP
John O'Brien, GCRG
Don Ostler, UCRC
Bill Persons, AGFD
D. Randolph Seaholm, CWCB
Mark Steffen, Federation of Fly Fishers
Larry Stevens, Grand Canyon Wildlands Council
Bill Werner, ADWR
Michael Yeatts, The Hopi Tribe

Committee Members Absent:

Cliff Barrett, UAMPS
Steven Begay, Navajo Nation
Christopher Harris, Colo. River Board of Calif.
Norm Henderson, NPS
Amy Heuslein, BIA
John Shields, WY State Engineers Office

Alternates Present:

Garry Cantley
Leslie James
Don Ostler

For:

Amy Heuslein, BIA
Cliff Barrett, UAMPS
John Shields, State Engineers Ofc./WY

Interested Persons:

Jason Alberts, DOI
Matthew Andersen, GCRMC/USGS
Glenn Bennett, GCMRC/USGS
Shane Capron, WAPA
Marlis Douglas, Colorado State Univ.
Helen Fairley, GCRMC/USGS
David Garrett, M^3Research (Science Advisors)
John Hamill, GCRMC/USGS
Ted Kennedy, GCMRC/USGS
Barbara McKenzie, GCMRC/USGS
Ted Melis, GCMRC/USGS
Anthony Miller, Colo. River Comm./NV
David Topping, GCMRC/USGS

Meeting Recorder: Linda Whetton, USBR

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Welcome and Administrative. The Chairman welcomed the TWG members, alternates, and interested persons. Attendance sheets were distributed. On behalf of the AMP, Kurt thanked Phil Lehr for his work in the program. Phil was one of the original members and will be retiring at the end of November.

Final Humpback Chub Genetics Report. Marlis Douglas distributed copies of the report, "Genetic Structure of Humpback Chub *Gila cypha* and Roundtail Chub *G. robusta* in the Colorado River Ecosystem" (***Attachment 6a***) and then gave an accompanying PPT presentation (***Attachment 6b***).

***Q**: Where were your Yampa Basin bonytail samples derived from? (Davis)*
***A**: They were broodstock from the Alamosa native fish hatchery. (Douglas)*
***Q**: I thought they were derived from Mojave. Wwhen you draw the relationship between bonytail in the Upper basin and a distinction where they're from, does it make any sense to say that they're from the Yampa Canyon or from Desolation when they're all derived from Mojave? (Davis)*
***A**: We did not really say that the bonytails were from the Yampa. We only had 50 bonytails in our analysis just to see how would bonytail look like. It was mainly important for the mitochondrial DNA analysis and those species are so distinct and I think Tom Dowling had an analyses where he had more samples also some bonytail maybe came from the upper basin that showed similar signal. (Douglas)*
***Q**: You're showing them from the upper basin when in fact they're derived from the lower basin. (Davis)*
***C**: If I'm not mistaken, you were looking at geographic locations of humpbacks from Yampa, Desolation, Black Rock, but the bonytails were just an outgroup. I don't think she presented bonytails as being for any location. They were simply done as an outgroup.(Andersen)*
***A**: Maybe this is where your question comes from. The Desolation Canyon humpbacks and the Desolation Canyon roundtail chub genetically looked similar like the bonytails we had in the analysis. That's interesting because morphologically they look a little different. They are similar to each other than to other chub specifics and they have a more delicate morphology as to the Cataract Canyon fish. (Douglas)*
***Q**: Yeah, because if those fish were all derived from Lake Mojave that has more significance than if there is any implication that they're from the upper basin because they're not. (Davis)*
***Q**: Just a follow up on John's question just what we should or should not infer source pool for effect chub in Grand Canyon in the LCR, right, should we infer anything about the success of reproduction or recruitment in the mainstem from those fish originating in the LCR over the course of the last thousand years? (Kubly)*
***A**: I think if local reproduction and recruitment happens, it's a much smaller proportion of the overall recruitment which is happening right here. The analyses was not fine enough to really pick up something which would distinguish family lots. One interesting thing is that when you look at the fish in Randy's Rock area they had a lot of deviations from the equilibrium and this was unexpected because it was not the genetic markers that we looked at because they were fine in all the other populations. These deviations in equilibrium can be caused by inbreeding. Inbreeding in the sense that maybe those fish are more closely related with each other than the other fish in the analyses would seem to indicate there could be some local reproduction in the Randy's Rock area that this is why those fish looked genetically more similar than the others in Grand Canyon. (Douglas)*
***Q**: The MUs and the ESU, I wonder if you might be able amplify the distinction between those two measurements as it relates to genetic emergence. How much data do you have to have? (Davis)*
***A**: An evolutionary significant unit usually looks at long-term conservation goal and there are six different definitions which many people don't agree on. One definition is that they do not share any mitochondrial DNA (MDNA) and they have to if you do a biogenetic field study. Some people think this is too restrictive of the definition if you just look at the genetics, however, Keith Crandall argues that we should look at the ecological aspects too. In the case of HBC, it's very difficult to get enough ecological data that you can really tell what ecological function it has now or had in the past in the ecosystem. When you look at population genetics and fast evolving markers like micro satellites, do we see distinct gene pools. This means that these populations have been separated for awhile, that they are not exchanging genes or do that they do not migrate from one population to the other and have reproduction there so there is some kind of separation between the two reproductively but they're not different enough to really call them distinct species. If you want to manage them like in the case of Grand Canyon, do not mix Grand Canyon fish with other basin fish because genetically they seem to be somewhat different.*
***Q**: A very loose, kind of open question is we're on the verge of managing this river for mainstream reproduction meaning potenitally you can't say the number of individuals in the 30-mile population which is more related to the upper basin so what are the consequences of that action on the Grand Canyon distinctive LCR population? (Stevens)*
***A**: I wouldn't be too concerned because it would be wonderful if the 30-mile population would grow expoentially but I don't think we really have to worry about that because there are such so few fish at the moment. Because we see some of the bonytail already in Little Colorado River fish and at Randy's Rock fish, this is historic. This has existed in the past and I don't think we should be concerned about the 30-mile fish migrating into the Little Colorado River and contaminating those fish. (Douglas)*
***Q**: If one were to establish a refuge of HBC offsite for conservation purposes, would you want to take fish from all the aggregates or would be taking them say just from the LCR be appropriate? (Christensen)*
***A**: I think taking them from the LCR probably would be appropriate because this is the largest population and you would have the best chance to catch as much genetic diversity as there actually is in Grand Canyon by sampling those fish If you establish a population outside for propagation purposes, it should be very large. This is always the concern if you do these artificial propagations because if the populations are not large enough and then you have offspring from only one. Because not everybody in captivity will reproduce or be able to reproduce successfully, then you only have a few individuals producing offspring. Iif you put those fish back in the wild, they could swamp out the diversity which is*

naturally existing. If have fish in a hatchery situation, have as many as possible because it has to be large to maintain high genetic diversity and if so do monitor the F1s, F2s, etc. to see if you lose genetic diversity over time. (Douglas)
***Q**: This business about removing fish for situ hatchery efforts, we take a batch of young fish and translocate them to a hatchery. How much selection is there from larval state to adult stage in terms of selective forces that are acting on those individuals due to life cycle? How genetically different are the larvae from the returning adults? Has that been studied? (Stevens)*
***A**: It has been studied especially in salmonids where they have had in-situ propagations for many years and are quite different from the wild. Because the selection environment in a hatchery is different because they get fed, they don't have to find food, they don't have to swim very fast, etc., you end up raising "couch potatoes." If you put them back in the wild, they have difficulty coping in the real environment. The mortality rate early on is tremendously high and only a few will survive. (Douglas)*
***Q**: When you showed the distinct genetic separation between the lower basin and the upper basin, is that distinction something that has been lingering for a 100 years, 1000 years? Is it something you can tell from that? Is this a recent event or is this a long time event? Is this the result of the dam or has some thing else been going on? (Davis)*
***A**: I don't think it's not the result of the dam. I think we're seeing a natural, historic signal that probably goes back 8,000 years. When we had this population crash in the flannelmouth sucker, we think the population survived somewhere in Grand Canyon. They have these deep scatter holes that could be a place. Flannelmouth suckers most likely happened for HBC as well and then there was a recolonization from the lower basin into the upper basin or Grand Canyon into the upper basin so we see this genetic signal. (Douglas)*
***Q**: Regarding research on the subject of conservation of HBC, what would you do next? (Werner)*
***Q**: You mentioned that if you wanted to create a refuge population of HBC and you'd want a lot of fish. What do you consider a lot of fish? (Knowles)*
***R**: Probably 10,000 or more. You would need a very large number of fish to maintain that genetic diversity in the population. (Douglas)*
***Q**: My idea of a refuge sounds like it's different than your's. I think what we're talking about in Grand Canyon is just having a pool of adult fish to serve as an insurance policy. The intent I think is if there is any reproduction, the F1s would either be destroyed or used for research animals and all we're trying to do is maintain a group of adult fish, replenishing them with fish from the wild as they die, 300-500 fish. Do you see any value in that? (Persons)*
***A**: It depends on what kind of research you want to do but why would you want to destroy the F1s?*
***R**: Because of those genetic concerns. We don't want to put them back in the wild until we're sure that they're genetically fit to go back in the wild and I don't think we can afford to keep 10,000 fish off-site and I don't know if we would want to. (Persons)*
***C**: The way we're thinking about it now is take young fish, rear them up, and if there is a lot of selection on those fish in the wild, those that have survived in the hatchery could potentially be a very different makeup than those that would naturally survive. You do want the hatchery fish to have passed through the similar selection to keep them in their natural habitat. (Stevens)*
***R**: We want them to be representative of the fish in the wild. (Persons)*

Results from Recommendations on the Ad Hoc Group for the science plan and Rick's concerns for a BHBF.

Ken McMullen said the Sediment and the Desired Future Conditions ad hoc groups met last night and came up with the following recommendation:

> The TWG would accept the BHBF Science Plan as presented subject to GCMRC consideration of the following requests for plan modification and priority of project implementation:
> - For sediment-based studies, initiate projects 1a, 1b, and 1c.
> - For the biological components: initiate projects 4b in Appendix C (which is now combined with Appendix B).

Dennis provided the sequencing results of the projects. There were 12 individuals who voted and he provided the sums of the ranks, the re-ranked projects, and the cumulative costs of those projects. Dennis clarified that they ranked the priorities for a BHBF in terms of projects. Kurt questioned that in an attempt to make the recommendation briefer, would it be acceptable to just say "to accept the BHBF Science Plan presented with the following requests for plan modification" and just put in bullets as initiate projects 1a, 1b, 1c, and Appendix C without having to list out these and then go to this bullet "initiate projects 4b, Appendix C and B."

Kurt said he was hoping to deal with the recommendation on the science plan and then discuss a motion for a BHBF in 08.

Larry Stevens proposed the following motion:

Proposed Motion: Based on comments provided by the TWG, BHBF, and DFC AHG Committees and the TWG in general, the TWG recommends that the AMWG accept the GCMRC's BHBF Science Plan with due consideration of project priorities. TWG further recommends that GCMRC engage in a synthesis of the information gained from previous BHBF tests, discussing objectives, results learned, and remaining questions to be answered in upcoming BHBF tests. TWG recognizes that the GCMRC Science Plan should be evaluated from a policy standpoint by the AMWG and further recommends that AMWG engage in that policy evaluation by mid November 2007.

The members raised the following concerns:

- *I want to see those changes incorporated in the motion and/or attached to the motion. (Barger)*
- *The changes haven't been widely discussed with the TWG. I would suggest sending those on for consideration by the Center but it's really the Center's plan and so they should consider them. I wouldn't agree that we should assume that just because we discuss in the ad hoc group it is something that is going to be used by the program. (Johnson)*
- *I don't want it attached at this point. It's my understanding there are a number of issues and some of the changes that I saw in the text from last night actually got to match the table here. I can see forwarding it to GCMRC but I don't concur with it as a recommendation to AMWG. (Yeatts)*
- *I think our recommendation should be to the Center to consider the input and provide another draft or provide a report for further consideration by AMWG. I'm not sure quite how you want to do it but I don't think we're ready to recommend it to AMWG. (Seaholm)*
- *What is 1c-3c sandbar, the $635,000 because I can't figure out. It is $498K plus the $136K. It's the whole part? I can't match the $635K on there. (James)*

Kurt asked the TWG how they thought they could formalize a recommendation to the AMWG by next month. He said they have three choices: 1) massage this motion, or 2) go with Rick's motion, or 3) don't take action on the science plan right now and propose an iterative process where they can reach some recommendation.

The members continued to express concerns about the plan:

- *I don't think we were charged to make a first cut on what we wanted to fund in a 2008 BHBF. We're cutting items from the science plan. Do we want to have the technical information in there for the whole suite of resources? That should be a separate decision. (Yeatts)*
- *We listed 5 broad categories of issues of concern yesterday: 1) sandbar and nearshore responses and potential erosional impacts, such as in Glen Canyon to sand deposition contribution to Aeolion sand supplies to protect upper archeological sites, 2) the assessment of nearshore habitat and foodbase responses, 3) Native fish movement and population responses to BHBF and a relation to changing thermal conditions where seasonally appropriate and in relation to the adequacy of the overall HBC monitoring program or maybe native fish monitoring program, 4) need for an economic analysis that may not take place through this process but it would be something that would be done on a BHBF to inform all of us of what the actual costs are and how those relate to recreational impacts, etc., and 5) integration of the BHBF and related ecosystem information into an overall ecosystem structure and function assessment including an assessment of future BHBFs timing and hydrography. (Stevens)*
- *Most people thought the science plan was technically sound and maybe GCMRC needs to show how they're going to address the changes to the AMWG so that the TWG is telling AMWG that we had these considerations. We want GCMRC to clarify how they dealt with these, whether they were in the report or not, that maybe that would at least let AMWG know what we were concerned about and hear how it was addressed rather than waiting for us to see how they're addressed before we can make another decision. (Barger)*
- *If this is a generic science plan, we've identified in our Strategic Plan many EINs that are dealing with experiments. What are we supposed to be testing for? What kind of information do we want to get? I think I listed 12 of the 33 questions that we have are being addressed by this science plan so if this science plan is*

supposed to be generic, it isn't answering the bulk of the questions we've asked. I don't see how it can be called a generic science plan. It's more specific to this year. I don't see it being a comprehensive science plan to cover all those questions. I'm not sure we can write a science plan to cover all those questions but at least this one is not generic to the bulk of questions that we've asked. (Davis)

Larry withdrew his previous motion and offered the revised motion:

The TWG considers that the GCMRC's BHBF Science Plan to be technically adequate and recommends that AMWG accept the plan, but suggests that AMWG consider the following issues in relation to priorities and budgeting:

1) **Sandbar and near-shore responses and potential impacts on Holocene deposits.**
2) **Assessment of near-shore and foodbase responses**
3) **Native and non-native fish movement and and population responses to the BHBF and in relation to changing thermal conditions, where seasonally appropriate, and in relation to the adequacy of overall HBC monitoring**
4) **A comprehensive economic analysis of BHBF costs and impacts**
5) **Integration of past BHBF and related ecosystem information into overall ecosystem structure and function, including assessment of future BHBF timing and hydrography, and discussing objectives, results learned, and remaining questions to be answered in upcoming BHBF tests.**

TWG recognizes that the GCMRC Science Plan should be evaluated from a policy standpoint by the AMWG, and further recommends that AMWG engage in that policy evaluation by mid November 2007.

The TWG continued to discuss the motion and the merits of the BHBF Science Plan. Mary said there were two pages of concerns prepared by the Sediment AHG and the DFCAHG last night and asked how GCMRC was going to address those. John Hamill said his staff would review those comments, revise the plan, and even suggested the possibility of preparing a response table so the AMWG could see how they responded to the concerns.

Kurt said he felt that both ad hoc groups need to bring their reports back to the TWG and the TWG needs to review/approve them before they're sent on to GCMRC. That's the function of ad hoc groups, to do a lot of work on behalf of the larger body. Dennis added that it needs to be done on the protocol schedule of the TWG. He said that Kurt had actually communicated with the ad hoc chairs and received no responses. Reclamation also didn't receive anything in advance of the TWG meeting therefore people weren't able to review the materials beforehand which leads to the confusion at the meeting because people haven't been able to assimilate what the recommendations are.

As chairs of the respective ad hoc groups, Ken said the two ad hoc groups were comfortable with providing their recommendations to the TWG and to let the TWG determine how they want to handle those recommendations. He said both he and John were satisfied that the ad hoc process for the recommendation on the science plan was completed. Dennis said the Sediment AHG didn't make a recommendation. John O'Brien responded that the Sediment AHG is different from the DFCAHG by one person and that could have been him and in reviewing the BHBF, the DFCAHG was also reviewing the BHBF and the comments that were taken into the Sediment AHG were the same comments that were made by the DFCAHG. As a result, John said the DFC AHG won't be looking at the proposed sediment and transport modeling but for this effort it was essentially a waste of time to have the separate meetings and the separate phone calls. He didn't think the Sediment AHG report was going to look any different than the combined report which looks the same as the DFC report on the BHBF science plan.

Ken said that John would work with the DFCAHG to finalize the Sediment AHG Report and that's what they did last night. Dennis agreed saying that while they had a very good working session last night, they didn't work on a report collectively and the first time he saw something was this morning.

Kurt asked the group to vote on the motion.

Motion proposed by: Larry Stevens
Motion seconded by: Bill Werner

The TWG considers that the GCMRC's BHBF Science Plan to be technically adequate and recommends that AMWG accept the plan, but suggests that AMWG consider the following issues in relation to priorities and budgeting:

1) Sandbar and near-shore responses and potential impacts on Holocene deposits.
2) Assessment of near-shore and foodbase responses
3) Native and non-native fish movement and and population responses to the BHBF and in relation to changing thermal conditions, where seasonally appropriate, and in relation to the adequacy of overall HBC monitoring.
4) A comprehensive economic analysis of BHBF costs and impacts
5) Integration of past BHBF and related ecosystem information into overall ecosystem structure and function, including assessment of future BHBF timing and hydrography, and discussing objectives, results learned, and remaining questions to be answered in upcoming BHBF tests.

TWG recognizes that the GCMRC Science Plan should be evaluated from a policy standpoint by the AMWG.

Representative	Stakeholder Entity	Vote	
Bill Persons / Scott Rogers	Arizona Game and Fish Department	y	
Amy Heuslein / Garry Cantley	Bureau of Indian Affairs	absent	
Dennis Kubly / Randy Peterson	Bureau of Reclamation	n	
Mike Yeatts	Hopi Tribe	y	
Kerry Christensen	Hualapai Tribe	y	
Ken McMullen / Jan Balsom	National Park Service - Grand Canyon	y	
Norm Henderson / Chris Kincaid	National Park Service - GLNRA	absent	
Steven Begay	Navajo Nation	absent	
Jonathan Damp	Pueblo of Zuni	y	
VACANT	San Juan Southern Paiute Tribe	vacant	
Charley Bulletts/LeAnn Skrzynski	Southern Paiute Consortium	y	
Glen Knowles	U.S. Fish and Wildlife Service	absent	
Mary Barger / Shane Capron	Western Area Power Administration (DOE)	n	
Rick Johnson / Nikolai Ramsey	Grand Canyon Trust	y	
Larry Stevens	Grand Canyon Wildlands Council	y	
Mark Steffen / Tim Steffen	Federation of Fly Fishers	n	
John O'Brien / Andre Potochnik	Grand Canyon River Guides	y	
Bill Werner	Arizona	y	
Christopher Harris	California	absent	
Randy Seaholm	Colorado	n	
Phil Lehr	Nevada	n	
Jay Groseclose / Don Ostler	New Mexico	n	
Robert King	Utah	y	
John Shields / **Don Ostler**	Wyoming	y	
Bill Davis	Colorado River Energy Distributors Association	y	
Cliff Barrett / **Leslie James**	Utah Associated Municipal Power Systems	n	

	Total Yes	**13**	
	Total No	**7**	
	Total Abstain	**0**	
	Total Voting	**20**	
	Motion passes		

Kurt said that Rick Johnson had given him language for a motion yesterday but was presenting it today. Rick said that yesterday Dave Topping talked about the sediment conditions in GRCA and from his perspective that provides the program with a phenomenal opportunity to learn a lot about BHBFs in GRCA under the enriched sediment conditions. Rick said he developed this motion following yesterday's discussion.

Motion proposed by Rick Johnson:

The TWG recommends to the AMWG that an experimental BHBF take place in 2008 as follows:

a. **The hydrograph should resemble the November 2004 hydrograph**
b. **The BHBF will be implemented in late March or early April.**
c. **A science plan specific to a spring BHBF will be provided for TWG review by mid-January 2008**

At a minimum, the BHBF experiment should address the following general questions:

a. **To what extent can BHBFs be used to rebuild and maintain sandbar habitats?**
b. **Do sandbars deposited by BHBFs contribute to the preservation of archaeological sites?**
c. **Do nearshore habitats created by BHBFs (under enriched sediment conditions) benefit humpback chub and other native fishes?**

Additional priority questions include those that would benefit the selection of the most beneficial alternative in the LTEP.

A science symposium to synthesize information derived from BHBFs and HMFs will be slated for WY 2009.

Recommend an AMWG conference call in early November.
Motion seconded by: Larry Stevens

Comments:

- *It would've been very helpful to have had a heads up on the motion because I'm representing a constituent and I don't have the ability to call UAMPS members at this point and ask them want they think about this motion. (James)*
- *Just a point of order on this. When we get a proposed motion, we're supposed to have those out in advance of the meeting. We're only considering today the sufficiency of the science plan without looking at whether or not to recommend a BHBF so I don't know why we're discussing this at all. It's not on the agenda. (Davis)*
- *It's not on the agenda. If that was that intent to do this, then it should've been on the agenda so we could've considered the fact that we were going to be asked to consider a recommendation on proposing a BHBF and that's not on the agenda anyway. (Persons)*
- *Because this is a discussion every year pretty much for us, we don't receive the triggering information until a month before this kind of meeting, if then. Sometimes not until mid-October do we actually have the trigger clarified therefore unless we have it kind of pre-built into our schedules every year to think about it and discuss at the August meeting and then really work up the details up in the mid-fall meeting, maybe that's the*

suggestion that needs to come out of here procedurally so we must expect these discussions each year. (Stevens)

- *One of the concerns I have for a BHBF vote is not having the background information to see if we have the legalities lined up. I know we've met the sediment trigger but what about the rest of our compliance issues and without the NEPA analysis, what are the impacts of a BHBF on the resources? What are the proposed impacts to endangered species down there? I don't think we have the information for the motion to pass. (Barger)*
- *I would like to see that analysis too. I'm skeptical as I always am, cynical perhaps even too that that's simply when the scientists want to do it. (Steffen)*
- *Setting aside my procedural issues, you say the hydrograph should resemble the November 2004 hydrograph. There was a comment made yesterday about conditioning flows and until we see exactly what the proposed hydrograph looks like, you can't determine what the costs implications are. I asked this at the AMWG meeting in August as well, if depending on the impacts, what is the status of the basin fund and what would the program not do to mitigate the costs of the power generation impacts? That's a question I brought up in August, and I brought it up yesterday, and so it's still a question for me. (James)*
- *We're asking for a hydrograph but we haven't said we're going to do one so no one is in charge of developing a hydrograph. I see it as a two-step approach and we have to agree or not agree that we even want to go forward with developing that. I think it's been stated that we are getting ourselves into a time crunch and we're going to become irrelevant if we don't do anything pretty soon because if it's going to happen in 2008, someone is going to make a decision pretty quick to keep the ball going and we'll just be out of that loop. (Yeatts)*

Kurt said that a discussion of the TWG Operating Procedures could be put on the calendar for a future discussion but right now he wanted to deal with the proposed motion. He reminded the TWG that they passed a motion regarding the 08 budget in the conference call held in July that says: "The TWG recommends the FY08 budget and workplan in the amount of $9,485,056 as adopted by the TWG on July 23, 2007. The TWG is recommending continuation of MLFF for WY08 but further deliberation and recommendation by the TWG for or against conducting a BHBF test in 2008." It was passed by 18 for, 1 against, and 0 abstaining.

Kurt admonished Rick for presenting a motion and then having to leave before it could be voted on by the TWG.

Larry seconded the motion.

Mary asked for a 10-minute caucus before the vote was taken.

John Hamill said they don't have a trigger at this point. The trigger that they used to have has expired. The only trigger is the one that was in the 1995 EIS.

Ted pointed out that in their handouts and briefing materials there is no mention of the trigger except where they tried to characterize the 07 sand production relative to what was required previously to trigger the BHBF test in 2004. There is no approved sand trigger at this point. GCMRC is simply providing input on their monthly protocol sand inputs during the water year but it is relative to something that was previously used as a trigger.

Mark said that what Rick is proposing is barely an adequate amount of time to do all the planning, accepting a science plan, and doing the NEPA compliance. He thought it should be put off until the LTEP when there is more time to do the NEPA compliance and probably avoid having at a time when it's going to be bad for the Marble Canyon economy.

Motion proposed by: Rick Johnson
Seconded by Larry Stevens

The TWG recommends to the AMWG that an experimental BHBF take place in 2008 as follows:
a. The hydrograph should resemble the November 2004 hydrograph

b. The BHBF will be implemented in late March or early April.
c. A science plan specific to a spring BHBF will be provided for TWG review by mid-January 2008

At a minimum, the BHBF experiment should address the following general questions:
a. To what extent can BHBFs be used to rebuild and maintain sandbar habitats?
b. Do sandbars deposited by BHBFs contribute to the preservation of archaeological sites?
c. Do nearshore habitats created by BHBFs (under enriched sediment conditions) benefit humpback chub and other native fishes?

Additional priority questions include those that would benefit the selection of the most beneficial alternative in the LTEP.

A science symposium to synthesize information derived from BHBFs and HMFs will be slated for WY 2009.

Recommend AMWG convene a conference call in early November.

	Stakeholder Entity	Vote	
Bill Persons / Scott Rogers	Arizona Game and Fish Department	n	
Amy Heuslein / Garry Cantley	Bureau of Indian Affairs	absent	
Dennis Kubly / Randy Peterson	Bureau of Reclamation	a	
Mike Yeatts	Hopi Tribe	y	
Kerry Christensen	Hualapai Tribe	n	
Ken McMullen / Jan Balsom	National Park Service - Grand Canyon	y	
Norm Henderson / Chris Kincaid	National Park Service - GLNRA	absent	
Steven Begay	Navajo Nation	absent	
Jonathan Damp	Pueblo of Zuni	n	
VACANT	San Juan Southern Paiute Tribe	vacant	
Charley Bulletts /LeAnn Skrzynski	Southern Paiute Consortium	absent	
Glen Knowles	U.S. Fish and Wildlife Service	absent	
Mary Barger / Shane Capron	Western Area Power Administration (DOE)	n	
Rick Johnson / Nikolai Ramsey	Grand Canyon Trust	absent	
Larry Stevens	Grand Canyon Wildlands Council	y	
Mark Steffen / Tim Steffen	Federation of Fly Fishers	n	
John O'Brien / Andre Potochnik	Grand Canyon River Guides	y	
Bill Werner	Arizona	n	
Christopher Harris	California	absent	
Randy Seaholm	Colorado	n	
Phil Lehr	Nevada	n	
Jay Groseclose / Don Ostler	New Mexico	n	
Robert King	Utah	n	
John Shields / **Don Ostler**	Wyoming	n	
Bill Davis	Colorado River Energy Distributors Association	n	
Cliff Barrett **/ Leslie James**	Utah Associated Municipal Power Systems	n	
	Total Yes	**4**	
	Total No	**13**	
	Total Abstain	**1**	
	Total Voting	**17**	
	Motion fails		

Larry proposed the TWG form a BHBF ad hoc committee to discuss the issues of concern for conducting a BHBF in 2008 and that ad hoc to meet and deliberate on those issues and the TWG hold a conference call sometime the first half of November to reconsider this topic.

Kurt asked if there was any objection to forming a BHBF ad hoc group. The following comments were made:

- *I think Reclamation has a number of things they have to put together and comply with in terms of the EA to go forward and I would rather see that information coming from Reclamation than from an ad hoc group to Reclamation and give us something to react to as opposed to trying to put something together. I don't think another ad hoc group is particularly helpful to this process. (Seaholm)*
- *And even if they could, it's duplicative of the LTEP process. They are stretched thin enough trying to get that analysis done and this would just be something in addition or it would just be the same. It's a jump on the LTEP process and so this could be challenged as pre-decisional so I just don't see the need for it. With climate change indications we're getting, these sediment conditions are not going to be as rare in the future as they were in the past. If you believe what the scientists telling us, we're going to be getting less snow in the upper basin and more thunderstorm events and that brings in more sediment into the Paria and we've seen it the last couple of years so just to say that we have a lot of sediment now and we're never going to have in the future, I haven't seen the proof of that. (King)*

As a matter of saving time, Kurt asked the members for a show of hands in support of forming a BHBF ad hoc group.
Voting results: Yes = 3 No = 9 Abstaining = 4

Lake Powell Water Quality Update. Matthew Andersen said that Bill Vervieu prepared a few slides (***Attachment 7a***). Since this was the first meeting following the end of the water year, he wanted to provide pictures of what's been happening in the reservoir this year in relation to previous years. Ted added that the daily high in September is equivalent to the daily low in August so all of sudden the residence time in that reach changes abruptly overnight. Ted suggested that they might also want to look at the penstock temperatures. Ted distributed copies of the "A.2 Ongoing Provisional Monitoring Project Report (***Attachment 7b***).

Scope of Work Regarding Selenium Effects on Native Fish in the Grand Canyon. Ted Kennedy said that Dave Walters and many of the people on the foodbase team joined GCMRC on their April river trip and based on data he collected there, was able to secure funding from USEPA to look at mercury in the food web. He mentioned that Rick Johnson had given him a recent article that looked at exposure to mercury and also selenium of fishes in the Colorado River so based on the conclusions of that article, Dave was able to get additional funding and expand the scope of work. He was planning to include selenium and mercury. Dave Walters is going to be the lead and is mostly going to focus on selenium. Ted distributed copies of the report, "Characterization of Selenium and Mercury Exposure in the Colorado River Food Web in the Grand Canyon (***Attachment 8a***) and gave a PPT presentation (***Attachment 8b***).

Q*: How are the toxicity thresholds expressed? Is that LD50's? The levels you show for selenium in the upper basin for carp were above the threshold yet there doesn't seem to be a shortage of carp in the upper basin? (Werner)*
A*: Right. The toxicity thresholds are established based on lab studies and also empirical observations. They're not to the grade of LD50. Those thresholds basically represent a level where you may reasonably expect to start seeing adverse impacts, not necessarily mortality but things like deformities or lower reproductive output. The paper where those graphs came from they looked at a variety of other contaminants and they also did histological examinations of these fishes and they found no evidence that those selenium levels were leading to liver problems or anything like that. Basically they found some degree of deformities in some of these fishes but they all appear to be due to parasites and not due to the elevated levels of selenium. The EPA has a draft guideline on selenium and they actually set the threshold at five times of what those lines were in that graph. The EPA's threshold in this draft document is like 7 micrograms per gram of body weight and the lines there were .75 or 01. (Kennedy)*
Q*: What do you see in the relationship between this material and dam operations? (Davis)*
A*: Basically you'll see elements like selenium or mercury being more available and so Lake Powell, maybe the water coming out of the lake, could potentially be higher in selenium or mercury concentration because of the presence of a*

lake. You end up seeing a lot of bio available selenium and mercury because of reservoirs and so that would be the ones that are linked to - (Kennedy)
***Q**: So is that right now considered the only anthropogenic source of selenium, no mercury you're looking at. It says contamination so when I see contamination, I always look at anthropogenic sources not natural sources. Are you looking at something other than natural sources? (Davis)*
***A**: We're going to start looking at below the dam but as far as the basin itself, I believe it has selenium rich soil so it's probably natural to have relatively high levels of selenium compared to the rest of the U.S. We know that irrigation practices in the upper basin contributed to sort of increasing the concentration that you see. (Kennedy)*
***Q**: As I recall 8-10 years ago, the Bureau was hot to trot on selenium and were looking up and down the Colorado River to see if any selenium showed up. I thought they had conducted a study of selenium distribution. Is that not right Dennis? I thought they did this a number of years ago.*
***R**: I think in the 1980's I was present on the river trips where tissues were collected for selenium. (Kubly)*
Q: Was that Park Service? (Kennedy)
***A**: I think it was FWS. (Kubly)*
***R**: I think that was Jerry Miller. (Persons)*
***R**: It wasn't on the trip I was on but Jerry may have been involved. (Kubly)*
***C**: Jerry got all hot to trot on it so definitely talk to Jerry because I think he has data from tissue samples in the tailwaters but I don't think I've ever seen it written up though. (Persons)*
***C**: That kind of information would be interesting to historical numbers and previous numbers on say the contaminants in fishes. The sort of unique thing that we're going to be doing though is coupling the data, numbers on selenium and mercury with our quantitative food web and basically build a selenium and mercury food web. We'll be doing something kind of novel and it's at no cost to this group. (Kennedy)*
***C**: Bill Davis, just one more response to your question. I think this kind of information is also valuable to us as we evaluate the condition of the native fishes prior to the course because they're endangered. To help us understand whether or not we think this is a factor in their decline or increase so if we find that mercury levels, selenium levels are apparently high in these fishes perhaps that would be a negative factor for them. If we find that it's a low amount and it's below established toxicity levels, then we would expect that that's not a factor in whether they are going up or down. It helps to make a complete picture of how those fishes are doing. (Andersen)*
***C**: As I recall the Bureau of Reclamation spent $1-1.5 million in the Grand Valley on selenium control, irrigation issues because they had a selenium problem getting into the backwaters there and I was under the impression that that study carried all the way down to Colorado and clear down to Yuma. (Davis)*
***R**: We'll talk with you and people at Reclamation and see about that information.*
***Q**: Are you going to be taking tissue samples from native fish then? (Persons)*
***A**: Yes. We have permits to collect limited numbers of native fish except for HBC so our plan is to do this basically with all the fishes in the river that we have a permit for. (Kennedy)*
***Q**: When you identified the site locations for sampling down the river, is that associated in any way with areas of selenium input that based on soils in the area or land use patterns? (Garrett)*
***A**: I'm not sure what went into their sampling design. (Kennedy)*
***Q**: Are you planning to do any hypothesis testing? (Garrett)*
***A**: Right now I don't think we have any hypotheses about what we're expecting to see. We're just going to focus on the canyon. We're building food webs at each of these sites and we're basically just overlay some of the mercury on top. (Kennedy)*
***Q**: You're building databases. (Garrett)*
***A**: Yeah. (Kennedy)*
***Q**: So the biological design sounds really good. The source is the issue I think for this body in terms of it is somehow dam affected here. One thing that was useful when we were doing uranium survey data down there was to look at the different tributaries because some of the tributaries are very hot and others are not. I would encourage you to think about the sources of uranium, if they are actually coming through the reservoir is one thing or if they're being brought in by the tributaries, that's another thing which could be some kind of downstream trend. Trying to distinguish the dam's influence here, if they are, if it is a sediment related issue, you have lots of pre-dam sediment you could sample for selenium to see if the pre-dam fine grain sediments have a higher load of selenium and do the full stand, do those contrasts to try and tease apart whether or not the dam is somehow exacerbating the selenium problem. (Stevens)*
***R**: On those graphs that you saw there, you can look at the differences in selenium of fish in upper versus lower basin so we've been sampling in the canyon. I think the closest upper basin site was maybe San Juan but basically there doesn't appear to be a big jump in selenium in fish in that upper to lower basin break. It comes when you hit the selenium rich soils in the upper basin. In that article where those figures came from, they cited other papers that basically attributed the elevated levels of selenium that are found in the lower basin to the irrigation of effects going on in the upper basin. (Kennedy)*
***Q**: Isn't it mostly mancos formation? (Kubly)*

***A**: Well, not even just all the mancos. The Bureau of Reclamation salinity group looked at some of that and there were a few hot spots. It's not generally mancos but the hot spots are in a mancos. (King)*
***C**: They're instituting management actions already in the recovery program in the upper basin to control salinity. This is a major issue for them and they done all kinds of testing to determine the levels and control in the backwaters, that they know the levels that kill the fish. I don't understand some of the things you're saying. There is a lot of information on fish impacts in the upper basin. (Davis)*
***R**: Right but to my knowledge there's limited data on fishes in Grand Canyon. Only one group has done this sort of mercury food level but that was on a very small stream and we feel that by looking at the qualities of these contaminants but also the pathways gone there. We can basically learn more about how these things biomagnify so we're going to be trying to figure out how it got there. (Kennedy)*

Preliminary Results from Shoreline Habitat Mapping Project and further results from the 2000-2006 FIST Project. Dave Topping said the first shoreline habitat classification was done in 2000 by Stephanie Metz and that was pretty much done by hand. Referring to the "hot zone habitat" Ted Melis said that was one of the reasons they flew it but the other was that there was a lot of cumulative linear habitat of a different scale that formed at stable flows throughout the system that summer. When they went back and looked at the automated approach that Mike Breedlove developed, the micro-habitats are starting to show up and could potentially be looked at in terms of change detection also. The images clearly show that those are hot spots and they have field measurements made by people that attest to the fact that they warm a lot. Ted said there is also another category of nearshore habitat outside the return current channels that can be characterized thermally in terms of the infrared imagery and then presumably can also be compared with the change detection that might go on in this kind of approach. He went on to say that could be a consideration for a future overflight having that thermal infrared band flown as part of it so they can capture this again. Ted said the shoreline mapping project systemwide was approved for funding for its first year in 2007 and is underway and in 2008. They're expecting a report on that comparing 2002 and 2005 specifically since those are systemwide overflights that are orthorectified and that report is expected in 2009 and then the FIST component, which is just a subset of reaches, that is also in the reporting phase for completion. Dave proceeded with a PPT presentation (***Attachment 9***).

***Q**: A couple of things we talked about last night and one of them had to do with the proximity of measurements before and after a BHBF of these soft sediment habitats and it looked like in the course of four or five months that you have measureable changes in some of those habitats at least. What do you think your ability will be to identify just how dynamic in time those changes are further down the road and then the second thing we asked and I think Dave had an answer last night but the group hasn't heard this. What's the relation between beach building and backwater or eddy return channel formation? When you get one, do you always get the other? And if not, what are the factors that control that relationship? (Kubly)*
***A**: Well backwaters are formed during these artificial flood releases and need the high flows to create the backwaters originally and obviously after that they change. The last example we had of a pair was the backwater at 22-mile was created say during the 2004 flood by 2005 after a lot of months of high fluctuations been gone. That's typically what happens is that they will evolve quickly over time if you have flows that are high but somewhat lower than the flood, they tend to fill those inner roads to sandbars. We had some discussions last night about ways of connecting the dots in terms of how these things change over time. We're working right now with the fisheries folks to make sure that the data they're collecting is part of seining trips is identical information in terms of the volumes and areas of backwaters that you get from those trips and does that match up with what we get from these surveys that are done at these same places once a year say for campsite sandbars or less frequently as part of these long mapping exercises that we're doing. We're doing that and other ideas that could be used would be re-operating some of the remote analog cameras throughout and seeing how these things are changing over a number of days because clearly what happens is if you have flow like the 04 test, these things will persist for awhile. In fact, they were quite large until the high fluctuations started in January and then some of them evolved quite quickly so some kind of daily record like that you can tell when your backwaters are changing. That's something we've been discussing as part of what may happen with our efforts to better integrate the fisheries backwater studies with the sandbar studies that are ongoing. (Topping)*
***C**: The current proposal for monitoring also related to these specific shoreline habitats, you have to keep in mind that we've kind of evolved I think through our planning process that these measurements more or less are scheduled to take place in the spring. The long reach mapping that Dave referred to will probably happen in its first year next spring in April or May. The next scheduled overflight is scheduled typically for late May, Memorial Day weekend, and that would be in 2009. They're also taking a course of the stable flow of 8,000 and that's always in our proposed strategy and we know that the occurrence of that stable flow after the pictures are taken is practically zero under normal*

operations. We don't have a stable flow most of the time so we're characterizing that the shoreline habitat under a condition that we hope is right in terms of the timing and usefulness of what it means because that's going into a spring season that presumably summer and fall are going to be important to fish but under a flow regime that's not typical of what happens afterwards. So how you use this information and relate it to the life histories success or not of whatever fish or organism you're looking at is a bit of a challenge because we're not trying to characterize it under a fluctuating flow with obviously a stable flow specifically to do the change detection. And so we need to think about how much of a problem that may be in the future if you don't know how to do fluctuating flows and take pictures and then compare sites one to one because the stage becomes a reference and is changing. (Melis)
Q: I think that's a good point. It looks like you may have a real good automated technique to count back or at least conserve this area of backwaters at 8,000 cfs but if we never see those flows, are we going to be able to correlate that with anything? (Persons)
A: So we've got a proposal and it may not be squeaky clean yet but it's at least an idea and that is that Breedlove's work here is obviously focused on lines that interface between land and water under a stable flow but with the HECRAZ model that you've supported and we expect the report to be finished soon, with the HECRAZ model we can generally relate those shoreline habitat lines into polygons that are state specific so let's say fisheries scientists are out there collecting data, shocking the shoreline, and we know the time they were there and where they were, we basically know what the stage was and then we can relate that into the maps presumably as part of this polygons and say well, those habitats were sampled at this time and actually it wasn't 8,000 tons, it was somewhere between 12,000 and 13,000 and rising and things like that. In the automated way, he can start looking at it in terms of a polygon using the HECRAZ stage estimates and say okay you've collected your data at this site, at this time, it relates to this shoreline habitat which in these photographs would look like it was up on the beach but in fact was at that time it was sampled the interface between line and water. So we can start doing more than just looking at 8,000 cfs lines and we can probably do that by using both modeling and GIS techniques in the future so think of change detection polygons along shorelines that might range between 8,000 and 25,000, something like that, or 8,000 and 45,000. Does that make any sense? (Melis)

Update from GCMRC on Tour with Lynn Scarlett last week. John Hamill said that last week the Deputy Secretary of the Interior, Lynn Scarlett, spent about a week in Grand Canyon National Park on invitation from Steve Martin, Superintendent of GCNP. On one of those days she visited was spent talking about the adaptive management program. There was a rather large cast of participants in the meeting including Lynn Scarlett, Bob Johnson, Dave Sabor, Brenda Burman, Bob Snow, Kay Roberts, Steve Martin, Martha Hahn, Jan Balsom, Norm Henderson, Ben Tuggle, Glen Knowles, Anne Kinsinger, Andrea Alpine, Ted Melis, Jane Belnap, Amy Heuslein, and myself. The day was spent with some briefings initially about various agency activities and perspectives on the AMP, a climate change presentation by Jane Belnap, a tour of Glen Canyon Dam conducted by Ken Rice, and then they did a 6-hour trip down to Lees Ferry Reach where they had various stops and talked about endangered species, HBC in particular, sediment conservation, BHBFs, AMP effectiveness, and cultural resources. Jan led a discussion about cultural resource protection in the Colorado River corridor, the LTEP, and tribal involvement in the AMP. He said no decisions were made on the trip. It was a good collaborative effort. The Deputy Secretary impressed upon them the expectation that at least within Interior that we work together collaboratively and there were some very candid discussions and exchanges of information.

FY08-09 TWG/GCMRC Planning Activities. Dennis said he wanted to impress on the TWG that given the LTEP schedule and the need to develop a science plan following the identification of a preferred alternative, they will probably have another transition year, a single budget year. He said one of the difficulties they're going to face is that the amount of the necessary LTEP funding will be unknown in the course of their standard schedule and process for developing the budget. He thought it would be good to bring back a proposal for what parts of the budget they think can be developed and see if they can get some feedback from somebody up the line on what amount to likely reserve for the LTEP. They have core monitoring reviews in some areas scheduled for this year. There were three major components of the budget that they identified at the AMWG: core monitoring, research, and development and experiments which would be LTEP once that's finished. He thinks they can work on core monitoring but didn't know if there were any R&D proposals and then LTEP is unknown.

Major FY08 AMP/GCMRC Milestones. John passed out copies of the "Major FY 08 AMP/GCMRC Milestones" (***Attachment 10***). He said one thing he wanted to talk about that they didn't get to today is the

annual project reports which GCMRC prepares that provides updates on each project in the workplan, what they committed to do, and what they actually did and then any recommendations from the principal investigators about things that should be changed in the upcoming fiscal year. He said he provided that information to the TWG on the assumption that it would be useful during deliberations for next year's workplan. It got almost zero consideration so John said he was wondering whether that's something the TWG wants because it takes a lot of effort to produce it in a format that is useful. GCMRC is still going to prepare an internal document for their use but since it never was used last year, he asked the TWG for feedback as to whether the form is something they want continued. He reviewed the items:

- GCMRC is going to come up with a general core monitoring proposal that will lay out the total scope of what the Core Monitoring Plan is for the next five years and what the likely cost of that will be. A draft should be available in November.
- The status of a BHBF test is unknown at this point in time. If it does happen, it will have ramifications for many of the other projects listed.
- A Core Monitoring Information Needs Workshop is going to be scheduled sometime in February 2008. The focus on that will be humpback chub which will lead into a HBC PEP and a Trout PEP later on in the year. There's been discussion on whether those can be combined into a single PEP. Both the HBC and the Trout PEPs are on the slate for moving into the core monitoring review process in the year and that would be done under the auspices of the Core Monitoring Evaluation Report.
- If a project review is going to be done, John said it would have to be done in the January-February time frame. He thought the group may want to engage in that process for a full day meeting but the TWG needs to decide whether they want to do it or not.
- GCMRC will produce general program guidance sometime in March or April of 2008 and take it to the AMWG for their review in May and then actually have a workplan done in July-August.
- John would like some early discussion on what next year's hydrograph is going to be. It makes him real nervous when he walks into an AMWG meeting in August or September and somebody throws out some proposal for a hydrograph because that has major implications for what they do and how they do it.
- They are going to be working with their partners in the upper and lower basins to put together the Colorado River Science Conference.
- He reviewed GCMRC's schedule for work on the LTEP and an LTEP Science Plan.

He thought by providing the above dates, the TWG could develop their own calendar of what will be done so there is some structure and direction on where they're going.

***C**: It seems kind of late in the year to be doing the FY09 annual work plan and working with the BAHG. Norm had put together an old schedule on when annual work plans should be initiated. I'm sure that's significantly earlier than that. We've got TWG review and AMWG review a month apart and we just never have enough time to look at the budget or work on it. I know we've asked for earlier review of the budget and stuff. (Barger)*
***R**: We'll do what we can on our end. If there's a desire on your part to try and adjust this, I'm open to those discussions. I'm not going to start working on next year's work plan next week and won't be able to spend a lot of time on it until after the first of the year. (Hamill)*
***Q**: Dennis, in terms of the BAHG, it's pretty late in the year to (Barger)*
***A**: I don't expect it to be any earlier. The same priorities that John is referring to we have internally. You know our schedule that the AMWG accepted it starts in June or July so we would've started several months ago. I just don't see a way to do that. (Kubly)*
***Q**: I guess I was hoping for something from the TWG for a TWG FY08 Activity Calendar. Is that not to be this year because of the LTEP? Can we ask for that? (Persons)*
***A**: You could certainly make one but there's nobody who is going to provide it to the TWG. That would be something you would generate for yourselves, right? (Kubly)*
***R**: Well, I thought the TWG chairs might take the lead on that. (Persons)*
***R**: We'll take the lead to ask you, "What would you like to have on your calendar?" We have a December meeting so we could do that then. (Kubly)*
***C**: I can attempt to draft a schedule and bring that to the TWG in December. (Dongoske)*

***C**: The December meeting is going to be problematic for GCMRC. We're going to be getting chapter 4 I understand about Dec. 1. We have a very rapid turnaround. I know Dave Garrett's involved in that. That's probably going to be a several hundred page document that we have to give a formal review of and comments back so Dec. 4-5 are not very good dates for us. Maybe if you'll have the meeting without us, that would be a great time to do it.*
***C**: Considering that we're really going to have to focus on the DFCs, I can see that being ,more of a work session than a regular meeting. (Werner)*
***C**: We'll see how the document gets prepared. (Dongoske)*
***R**: If it's like a budget thing where we have DFCs in the last hour, we're just going to have a train wreck again. I don't want to see two days worth of calendar filled with informational stuff and save work until the very end like this real common. (Werner)*
***C**: Just a comment to the group and it relates to your discussion. In 2004 the science advisors made a recommendation to the group and you might want to consider because of all that you have an executive committee that does the planning for you, maybe a combined budget planning with program planning. The reason for making that recommendation at that time was that we thought you were going to miss in adaptive management this warm water that was beginning to be wrote up and we thought that warm water was a critical issue to you. There was never or an AMP effective plan developed to do that and now last year there was a missed opportunity on a BHBF because a plan didn't exist and today a missed opportunity for a BHBF because certain things weren't recognized as being needed in place. I would like to bring back and I'd be remiss if I didn't do that recommendation from the science advisors. Maybe you could consider a standing executive committee that works directly with GCMRC to try to get you by these glitches and help you in your three or four meetings a year to have things in place and ready to move on them. (Garrett)*

Kurt handed out copies of the Roles Ad Hoc Group Report (***Attachment 11***) because as individual stakeholders they've been asked to comment on the report. He said it lays out a lot of responsibilities for the TWG and he would like their responses with respect to other aspects of the adaptive management program, like the AMWG, the Center, the SAs and whether those relationships are clearly articulated between the various groups in the report. He suggested that if they had changes that they could collectively submit as a group to the Secretary's Designee who will decide what to do with that report when it's finalized.

***C**: Be advised that that committee has now been assigned two additional tasks to revise this report, 1) is those recommendations that you sent in, and 2) plus from the Science Planning Group we now have to address those five key recommendations in there. (Garrett)*
***C**: My understanding as to what's going to happen to Roles Report is that comments that were provided as of October 1 will be used in the revision of that plan and then that plan will then be sent back to the AMWG and the AMWG will be asked to make a recommendation on that to the Secretary at their next meeting. And so I think the idea is to bring that document to closure and hopefully then that would be for implementation so the AMWG will be asked to take action on that at their next meeting. (Hamill)*
***C**: One of the problems I had with the report is that a lot of times they made recommendations but it didn't suggest ways for implementing those recommendations. Do you anticipate that this next version might? (Persons)*
***R**: The previous version of this had what was called an implementation plan that went along with it. It was something that Mary Orton had actually developed and so I expected - you're exactly right. These are kind of saying this what we're going to do and how we do it and I think - there are various things like AMP Effectiveness Workshops that are proposed to do some of this. There's simply change in the Operating Protocols to reflect that. I think there are a number of things that will be specifically recommended for taking this from here's what we ought to do to here's how we're going to do it. (Hamill)*
***Q**: Is that available or will that be in the next version of this report? (Persons)*
***A**: I would think that that would be something that would be provided to the AMWG for their consideration at the next meeting. The first step is to get the AMWG to say yeah we buy into this. (Hamill)*

Adjourned: 12:30 p.m.

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
LRRMCP – 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
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
RPA – Reasonable and Prudent Alternative
SA – 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

Updated: 7/27/0