

Glen Canyon Dam Technical Work Group Meeting
December 4-5, 2007

Conducting: Kurt Dongoske, Chairperson

December 4, 2007
Convened: 9:30 a.m.

Committee Members Present:

Mary Barger, WAPA
Cliff Barrett, UAMPS
Charley Bullets, Kaibab Band of Paiute Indians
Kerry Christensen, Hualapai Tribe
Jonathan Damp, Pueblo of Zuni
William Davis, CREDA
Jay Groseclose, NM Interstate Stream Comm.
Norm Henderson, NPS
Amy Heuslein, BIA
Rick Johnson, Grand Canyon Trust
Robert King, UDSR

Glen Knowles, USFWS
Dennis Kubly, USBR
Anthony Miller, Colo. River Comm./NV
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:

Steven Begay, Navajo Nation
Christopher Harris, Colo. River Board of Calif.

John Shields, WY State Engineers Office

Alternates Present:

Jan Balsom
Don Ostler

For:

Ken McMullen, NPS/GCNP
John Shields, State Engineers Ofc./WY

Interested Persons:

Matthew Andersen, GCRM/USGS
Glenn Bennett, GCMRC/USGS
Mike Berry, USBR
Shane Capron, WAPA
Lew Coggins, GCMRC/USGS
Helen Fairley, GCRM/USGS
David & Pam Garrett, M³Research
John Hamill, GCRM/USGS

Stewart Jacks, USFWS
Ted Melis, GCMRC/USGS
Anthony Miller, Colo. River Comm./NV
Mary Orton, The Mary Orton Company
Ken Rice, USBR/GCD
Dennis Stone, USFWS
David Topping, GCMRC/USGS
Randy VanHaverbeke, USFWS

Meeting Recorder: Linda Whetton, USBR

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 October 2-3, 2007, Meeting. Pending edits from the TWG Chair, the minutes were approved.

Review of Action Items. Kurt reviewed the action items and updates were made (**Attachment 1**). Regarding the Genetics Report completed by the Mike and Marlis Douglas, Dennis asked what the TWG does with the report now and if they intend to make any recommendations. He was specifically concerned about the comments Marlis made about on the size of refuge populations and the number of fish that should

be taken out of the system. He sees that as a very important management application and the TWG comments should be provided to Connie Keeler Foster as she finishes the Genetics Management report. Norm suggested that if the TWG concurs with the AHG that it is a technically and scientifically credible report, it should be approved and the report would be included in the HBC Comprehensive Plan.

Motion (proposed by Bill Werner): The TWG approved by consensus the Douglas and Douglas HBC Genetics Report.

Motion seconded (by Larry Stevens).

Discussion.

Revised Motion: The TWG accept the Douglas and Douglas HBC Genetics Report as scientifically and technically credible and comments made at the TWG meeting on October 2-3, 2007, be forwarded to the Douglasses for consideration.

Dennis said he was concerned with getting the information to the AMWG. Bill Werner said he thought the process was once the report was peer reviewed and accepted by the TWG, it was then a product which could be used by anyone. Bill Persons said he wanted it made real clear on Marlis' recommendation that if you establish a population outside for propagation purposes, it should be very large which is different from a refuge for population purposes. He wants to ensure that distinction is included in the minutes and provided to Connie Keeler Foster. Randy Seaholm suggested the report be held back until the complete HBC Comprehensive Plan can be sent to the AMWG. He also said the HBC Comprehensive Plan will need to go through the AMP In/Out Process. The following motion was presented for vote:

Revised Motion: The TWG accepts the Douglas and Douglas Humpback Chub Genetics Report as scientifically and technically credible and comments made at the TWG meeting held on October 2-3, 2007, be forwarded to Connie Keeler Foster and the HBC Ad Hoc Group for use in the final HBC Comprehensive Plan.

Motion passed by consensus.

Amy asked if the TWG wanted a timeline established for the HBC AHG to review that report regarding incorporating it into the HBC Comprehensive Plan. Glen said they're trying to utilize the best available science in the plan so it makes sense to incorporate it as an appendix and also add the Douglasses report as an appendix before delivering to the AMWG. He thinks they can complete their review and present at the next TWG meeting.

Action Item 2007:10.2-3(1). Dennis said the reason for this action item was that he didn't feel the TWG reached a procedural conclusion on the issue of finalizing products. He asked what the TWG's obligation is to the AMWG in its acceptance or rejection of technical reports and if there are management applications out of those reports. Using the example of how many HBC might be included in a refuge population or recapture population should be part of the recommendations from the TWG to the AMWG. He thought it was worth discussing and asked for comments.

Q: I think it's a good idea to summarize and pare down the documents we review for the AMWG along with some recommendations. In this case I think we're waiting on Connie Keeler Foster's part of the puzzle. It reminded me of a similar issue in the last meeting where we had a motion moving the TWG request something of the AMWG that they update the Strategic Plan. I wasn't sure how that recommendation gets moved forward. How does the TWG typically report these things to the AMWG? Do we just say it's in our minutes and it's done? Do we summarize the report into a few bullets? We don't have a standard process for doing that. (Persons)

C: We don't have a charge from AMWG to develop the technical aspects of that plan and management is one of those so that's pretty clear. It does behoove us to either remind or inform the AMWG which of the many reports that are being produced are actually really meaningful to the progress of the process. (Stevens)

C: It seems that the best thing this group could do is get the technical specialists, resources specialists, etc., and distill the information into management recommendations. (Balsom)

C: Typically when a scientific report comes forward to the TWG, we look it over and decide whether or not it's technically credible and if it is, then the report is accepted. If the report contains certain recommendations that have

management implications, then the TWG deliberates and either accepts, modifies, or takes action by moving onto the AMWG. (Davis)

C: Using the Sediment AHG as an example, they would review reports from sediment scientists and if they found the findings credible and concurred with the subset of the recommendations that were put forward in those reports, they would forward to the TWG for deliberation, and the TWG would deliberate and then forward to the AMWG. (Melis)

Dennis said one thing they could do was incorporate their methods into the TWG Operating Procedures and charge all ad hoc groups to include that function in their review. The TWG's function should be to consider the recommendations that are either in the report, pass on to the AMWG, or develop its own management recommendations and that could be vested within the ad hoc's charge.

Kurt asked the TWG members if they were in agreement with Dennis' suggestion. Hearing no objection, he closed the agenda item.

OLD BUSINESS

Status on LTEP. Mary Barger asked for a status on the LTEP. Dennis said he couldn't recall when the last cooperators' call was but that people are working on their writing assignments. It was his understanding the signing of the ROD on the shortage EIS will be done at the Water Users Meeting next week. He also added that last Thursday (11/29/07) the Secretary's Designee conducted a survey of AMWG members on their thoughts concerning a BHBF in early March. He didn't know what the next step was in that process but it's very clear that Interior is still considering a BHBF in early March. He added that Reclamation is taking information from the LTEP to begin writing the EA.

Review of the Ground Rules. Kurt reviewed the ground rules with the members.

Desired Future Conditions AHG Presentation. Mary Orton said it was her pleasure to help facilitate the work of the DFCAHG. She provided a copy of the agenda for the discussion (**Attachment 2a**) and said she would provide background information so the TWG knows how the DFCAHG got to where they are now. She referenced the memorandum dated November 20, 2007, from the DFCAHG to the TWG (**Attachment 2b**) and read the two recommendations from the memorandum:

- That the TWG forward the attached four sets of targets for humpback chub and sediment to AMWG (see Attachments 1, 2, 3, and 4, starting on page 3), and advise AMWG that TWG has found all four sets to be scientifically and technically credible.
- That the TWG recommend to the AMWG that TWG be charged with developing a range of options for targets for the remaining resources in the AMP Strategic Plan.

She directed the members to page 17 and reiterated that the targets were never quantified when the AMWG/TWG was working on the AMP Strategic Plan so that is the task before the TWG today. The targets need to be tied to the AMP Strategic Plan and the management objectives. She also pointed out that Reclamation requested the TWG dedicate sufficient effort to develop a set of technical options for the desired resource condition targets. During the DFCAHG Workshop, Mary said she spoke with Randy Peterson who clarified that if it were not possible for TWG or the ad hoc group to reach consensus on one set of targets, then he preferred some assessment of the scientific and technical credibility of those targets rather than a majority vote by TWG as to which one they liked best. They wanted it for the AMWG by December 2007 but it was Mary's understanding that the whole schedule of the LTEP has slipped. She left a message for Randy asking if it had to be done by December because that would have a significant impact on what could be done today but he declined to give any further guidance on the subject of timeline so she is assumed the work needs to be done by December. She read some of the relevant parts of the AMP Strategic Plan.

She said the DFCAHG spent some time before the workshop deciding on how they were going to operate and what they wanted at the end of the workshop. She referenced page 25 of the memo and stated the

purpose of the workshop was to review various proposed rationales used to develop target levels, and to come to consensus on the question: "Is this rationale for developing target levels scientifically and technically credible?" She said that both the Park Service and WAPA came in with targets and developed rationales which received a lot of challenges and language changes.

Dennis said that the way he reads the memo there is almost a disconnect between what one can agree on that the rationale for a particular target is scientifically and technically credible without necessarily agreeing with the assumptions themselves. Mary clarified that the assumption has to be within the realm of possibility. She gave the example that there is an assumption in the Park Service's proposal that a certain level of fish (numbers) is achievable in 10 years. She asked if there was a way in which anyone who could say yes or no that that is feasible, absolutely, and definitely. She said the group agreed it was not possible to know for sure and there were people who said they didn't think it could be done while others thought it could be done. She said there is a scientific justification for that number. She said the TWG may disagree with the assumption but the question today is not whether they agree with every assumption, but do they believe it is scientifically and technically credible.

Humpback Chub Report. Lew Coggins distributed copies of his report, "Abundance Trends and Status of the Little Colorado River Population of Humpback Chub: An Update Considering 1989-2006 Data" (**Attachment 3a**) and the corresponding PPT presentation (**Attachment 3b**). Lew said the report has been finalized, peer reviewed, and represents the most current analyses on stock assessment for humpback chub. The report also developed some new methodology that was largely in response to recommendations that were made by the Humpback Chub Stock Assessment Review Panel that AMWG called for and was convened in 2003. He provided the following conclusions:

- Model selection tools clearly indicate ASMR3 is most consistent with the data.
 - Why big changes in age-specific vulnerability over time?
 - Less trammel-netting in the mainstem?
 - More reliance on small hoop-nets in the LCR?
 - Limited temporal coverage?
- ASMR3 adult (4+) abundance estimates considering ageing error:
 - 2006 - 6,017 (95% CI 5,369–6,747)
 - 1989 - 9,322 (95% CI 8,867–9,799)
 - ~ 20-25% increase in point estimates since 2001
 - Most likely associated with increased recruitment beginning no later than 1999 and possibly as early as 1996
- ASMR Results do not track well with catch-rate indices or Spring LCR mark-recapture
 - For catch-rate data, not too surprising considering reliability of catch-rate metrics.
 - A bit disconcerting for Spring LCR abundance estimates, but not too surprising considering imprecision to detect a 25% increase.
 - Preliminary Spring 2007 LCR abundance estimate looks to be much larger than 2006 ~2x (Van Haverbeke, pers. comm.)
 - Provides support for ASMR, but questions reliability of closed population estimates in the LCR.
- Considering ageing error doesn't seem to add excessive bias, but does decrease precision
 - Need to have big changes in recruitment to detect with ASMR.
 - Argues for experimental treatments that have high probability to impart large changes in recruitment.
- Big changes (decreases in effort) in sampling program are not advised as it is problematic for data interpretation.
 - Witness long lasting effects of decreases in sampling effort ~1996-1999.

Update on Recovery Goals. Tom Czaplá (joined via phone) said they've received comments on the recovery goals from FWS staff who have been reviewing the current recovery goals. New information has been incorporated into them and they are now beginning to incorporate that information from the Service comments. Once that's done, they will be sending out to stakeholders in various programs to review and comment. He spoke with Rich Valdez earlier today and they're going to keep the track changes in the

document so people can see where changes were made. They're not sure of their timetable due to the upcoming holidays but hope to have them out before Christmas. With regard to a conference call they had with the DFCAHG where they talked about a particular number with regard to the adult population of HBC in the Grand Canyon population overall, they are currently working on some language to incorporate that into the recovery goals of the HBC and will get that language back out to the Service biologists first to make sure they're okay with it before it gets to the stakeholders. He said the language has to do with the potential carrying capacity in the adult population of HBC that existed at one time in the Grand Canyon population. It's not going to change what they've got as demographic criteria but just gives some sort of base point at which to start or at which to look at.

Q: I heard numbers of a 100K, 10K, and 6K. How far back are you talking about? (Davis)

A: We're looking at the general area based on information provided in the Valdez, Ryel, Douglas, and Marsh reports so that's the early 1990's. (Czapla)

Q: Are you using the same approach used in the 2002 recovery goals for determining minimum viable population? (Johnson)

A: Yes we are and just for clarification. When we wrote the 2002 version of the recovery goals, we didn't think that the 2100 number is a value for the Grand Canyon population because we felt it was way above that and the first demographic criteria is known as loss so the 2100 number was never a factor with the Grand Canyon population. They generally serve more than targets for two core populations that we were trying to establish in the upper basin. (Czapla)

Q: Can you comment on acceptability of the model and the estimates that Lew has just presented here, the acceptability of those to the Fish and Wildlife Service? (Hamill)

A: Lew provided some of that information to me a couple of months ago in Flagstaff. We asked for a concurrent sampling to occur and see how that might help to verify what the ASMR model was doing. I'm very impressed with the information Lew Coggins has assembled. I think the concurrent estimate and the ASMR model are prone to be very close and that the ASMR model is probably going to be a methodology that the Service should look at when they decide to finally start the clock. (Czapla)

Q: Any guesses when the clock might start? (Persons)

A: The potential is that once the Service meets with various stakeholders and other population biologists and ecologists and get some agreement, then the clock can probably start. It will probably be within the next couple of years. By saying that, meaning that the Service will probably make a decision as to when the clock starts, that's not saying the clock's going to start in a couple of years. They might decide it's 2005. I don't know. I'm just throwing out a number. Don't get excited. I see that happening in the next couple of years. (Czapla)

Q: It's possible the Service could say we're happy with the point estimate made in 1997 even though I don't know if there was one and that would start the clock. They could pick a date before the present day and say that they trust the data from this point, therefore the timeline starts now and the clock starts now. (Persons)

A: That's correct. (Czapla)

Q: Would you be adding any language about a second spawning aggregation? (Trammel)

A: I don't believe so. We considered the whole Grand Canyon as one population.

Q: In the DFCAHG deliberations there are arguments about the relative importance of recovery goals and removal of jeopardy, what's your read of the Endangered Species Act? Are those parallel paths or does one actually have some supremacy over the other? (Kubly)

A: My read has always been that if you can recover the species, there is no jeopardy. That's as far as I'll go. (Czapla)

Q: Does one have to move through removal of jeopardy to get to recovery? (Kubly)

A: Again, I'm not sure. It makes sense to me if you can downlist and delist a species once they've been delisted, then there is no jeopardy. I'm not real versed in this jeopardy issue stuff. (Czapla)

Q: Are you concerned with the restoration of the range of HBC or just the population size? (Stevens)

A: If you look at the recovery goals, don't just look at the demographics. The other threats have to be addressed. Things have to be done to minimize or remove the other threats to the species. (Czapla)

Additional Questions for Lew Coggins

Q: Lew, going back to a couple of your slides, are you happy with the model now or are there still things you see that would be good to improve? (Johnson)

A: This model has been reviewed more than anything I have ever done before by some of the smartest people in mark recapture. In many ways we've addressed every concern to the best of our ability. There's one other thing that could be done but I'm not sure it would change its performance much. It's just another strategy of how to go about the problem and in some ways it would make it a bit more mainstream in that the Jim Nichols, Dave Otis, David Anderson

group have approached these kinds of problems using a particular probability structure to explain how their data differs from their prediction. It's a **multinomial** error structure and it's quite accepted and there's been many things published about it over time. It varies little with the **Poisson** error structure that we use in ASMR. If we wanted to make everything we did completely in line with the biggest body of literature, we could. I could go to this kind of individual capture history set up with the data and then easily pigeon-hole into that kind of a probability structure. That would be just a mark recapture related thing. There is plenty we could do with trying to get a better handle on growth but unfortunately we would need to sacrifice more fish in some fashion to get that data. (Coggins)

Q: But in terms of developing ASMR, have you developed it to the point that we can go to it or is there something else that needs to be done or is it just refining what you're doing right now? (Johnson)

A: Overall for chub stock assessment, I think the best thing would be to really try and develop our remote pit-tag technology in the Little Colorado so it's more about feeding the model better and more data as opposed to refining the model structure to help us understand movement dynamics, capture probability, those kinds of things. At the October meeting I showed you some of the results of hoopnetting juvenile fish in the mainstem, and I'd like to build a model that tries to look at flow variation, immigration out of the LCR associated with fresh events, and changes in abundance in non-native fishes in that reach over time where we have that real highly resolute data and see if I can ascribe any of that variation in catch rate of relative abundance of juvenile fish in the mainstem for any of those factors and temperatures. That's trying to get at that recruitment process, that rearing process, and I would basically estimate a survival rate between those sampling events and trying to correlate that survival rate to these other factors. (Coggins)

Q: I want to go back to Mark's question which is really a seminal point here right, the differential model mix of the LCR and the mainstem. How far can ASMR take us in understanding that and wherein you get to the end of that? What else should we be doing? What would you advocate we're not measuring that we should be measuring to fundamentally get at that question? (Kubly)

A: We have tried to basically stage-structure models with the stage being different locations, the LCR. The problem is with correlations between capture probability and survival? When you start doing that, you end up with another correlation which is are you not observing the catches you expect because either you didn't catch the fish as well as you could've, they died, or they moved. They might actually have moved to another location. That just adds another level of complication in trying to figure out those dynamics so rather than trying to model that movement, we've just pulled the whole thing together considering it as a single population rather than looking at these different movement rates. Perhaps with the larger fish we could get an understanding of that movement if we had a much more highly resolute data of pit-tag movement in the LCR so then at least we could get an understanding of when these fish are moving in and out of the LCR as adults. The only thing to do is something along the lines of what I was just saying to Rick which was if we had sampling in the mainstem where we were really trying to track individual groups of juvenile fish in the mainstem and try to estimate their survival rate over time, then perhaps we could see differences under different operations for instance in survival rates. ASMR won't do any of that; that's just not what it is for. For instance if you wanted to do that, you might have to go back to a situation like Valdez and Ryel did years ago where they took monthly electrofishing samples below the LCR to look at the decay rates of relative abundance of fish in that reach and then say something about how those decay rates change over time perhaps under different operations or under different abundances of non-native fish. That was done in a fairly crude way but it would be that same kind of idea. (Coggins)

R: In general, there's probably some process that has to be mapped out, right, going beyond ASMR? I just look at it as so fundamental. We all argue and have differing opinions on what we should do with dam operations but when you get to the question of is it dam operations that largely is the cause. As long as you have the split, you can't answer it right? (Kubly)

Q: You talked about one population and I was just wondering whether this fit in with the Service's potential recovery goals where they're not going to be requiring the second spawning population be identified in the Grand Canyon? (Davis)

A: I don't know. I know as much as you do about how goals are being set. (Coggins)

C: So if I'm not mistaken that was always a BO requirement, the removal of jeopardy to have second spawning population. I don't think that's ever been an element of the 2002 recovery goals. Is that correct? I think what Tom would point to are some of the publications which we've been associated with, some not, but there's a Hawker/Coggins paper that talks about how the vast majority of the HBC population in Grand Canyon is really associated with the LCR. There's lot of recaps and pretty high sight fidelity to some of those other locations but the numbers are much, much smaller so the vast majority of that population is spawning there and spending much of their life. I think that's the kind of scientific literature that Czaplá would point out if I can speak for him. (Andersen)

Targets for Desired Future Conditions – WAPA. Shane Capron gave a PPT presentation on Western's targets for desired future conditions for humpback chub (**Attachment 4a**).

NPS Desired Future Conditions: Rationale and Targets. Norm Henderson distributed copies of the "NPS Desired Future Conditions: Rationale and Targets and then gave a PPT presentation (**Attachment 4b**). He said there are two parts dealing with the NPS rationale: policy and science. He began with the policy portion saying it applies to both sets of targets and said Melissa Trammell would cover the science rationale.

Melissa passed out copies of the targets for humpback chub and sediment and then gave a PPT presentation (**Attachment 4c**).

Comments/Questions on WAPA's presentation. Mary Orton reminded the TWG that the focus is on whether the rationale meets the test of being scientifically and technically credible.

Q: Both parties base their estimates from the very most recent time period and 2002-2006 was sort of a starting point in both groups because the whole population estimate time series is based on the same model, I'm curious why both of you decided that we're going to focus our starting point on the 2002-2006 time period. (Andersen)

A: Anytime you have endangered species what you're looking for ultimately in recovery is usually stable. You generally list because they're declining and if you're genuinely hoping for at least long-term stability, these are species large enough to be above that minimal viable point. In 2002-2006 time frame, I think you've met the requirements that were laid out in detail in the recovery plan to come up with credible estimates for those population numbers. GCMRC put together a good assessment of that information over the years and so we think you've met the requirement of the recovery plan that came out of 2002 to meet those credible estimates and that having no more decline from that point seems a reasonable target. (Capron)

R: We're not necessarily saying that the 2000 time frame should be when the clock has started, we're just recognizing that there's been an upward trend recently and we would like to see that trend continue. And if it does continue, we think we can meet our short and long-term goals but we're in no way suggesting that that should necessarily be the start of the clock. (Trammel)

Q: It's actually for both of the proponents. The recommendation from TWG doesn't have any acknowledgement of actions outside this program and I'm wondering whether they've considered that that should be part of the recommendations, an acknowledgement of recovery for example, actions that are outside the boundaries of the CRE. Randy Seaholm mentioned this morning that there's a committee that will take the HBC Comprehensive Plan, put it through an ensuing evaluation, so it's not a judgment on my part but more of a question for the DFCAHG. Did you consider identifying to the AMWG that you clearly recognize that there are actions in here that are outside the program and will require something like an appropriate program to accomplish that? (Kubly)

A: From WAPA's perspective, the fifth requirement to deal with Cameron Bridge is potentially outside the program but if we wanted to highlight it as potentially one of the largest threats to our own spawning aggregation, if our targets only do include one spawning aggregation than 2, which was in the previous case so I'm not quite sure how you deal with that but I think we had to recognize that there may be some threats that need to be dealt with that have traditionally been thought of outside the program especially some targets similar to this. And certainly it may be possible to meet certain parts of demographic recovery criteria within the program but not be able to address all the threat factors that are required to be met before downlisting or delisting can occur that are going occur outside of the program. So you could reach a population estimate that meets your demographic criteria but you may not have met your whole list of threats that need to be fixed by other actions that might be outside the program. That's where we get into this program is or isn't about recovery. You might be able to reach recovery for demographics but because things are out of the program that the money isn't spent on, you may not meet all your threats criteria for eventually to consider recovery. (Capron)

Melissa said she thought both the ad hoc group and NPS didn't consider that. One of their assumptions was that a recovery program in place would help with meeting the obligations. She thought there was a statement in the guiding principles that says some of the actions may be outside the scope of the AMP.

Mary asked if they didn't have a non-jeopardy determination in one of your targets so that was explicitly a FWS action.

C: Removal of jeopardy is present in the goal of the program. (Kubly)

Q: Shane, what do you think are the key differences between the Western proposal and the NPS proposal? Can you highlight those for us and maybe I'll ask you why you think yours are better. (Persons)

A: I didn't specifically go through and do that. I think some of the main differences are first target level for population estimates. We're looking at it from the perspective of trying to meet the recovery goals as we're trying to understand

them and that's kind of a moving target in this process. From the management objective, that's our guiding principle here in trying to meet those elements of viability and avoiding jeopardy. I think the Park Service, as you heard this morning, comes at it from a very different perspective of restoration and that MO doesn't really talk about restoration. It talks about viability and avoiding jeopardy and I think you're looking at it from the NPS perspective. It's a reasonable perspective but there may be other things that ultimately have to be done and so looking at it to try to get on a road to recovery and avoid jeopardy, we can pull some population numbers that we think are reasonable that if you had stable populations of that 5600 number roughly that you would be able to avoid jeopardy and be on the road to recovery. The other big difference is that we don't believe that additional spawning aggregations are necessary in the canyon because of the way the Service is viewing that recovery unit as all one population. Without a second spawning aggregation necessary for recovery, and therefore, because a second spawning aggregation is not necessary for recovery, it cannot be necessary to avoid jeopardy. This is my opinion based on my experiences that actions that result in jeopardy, the RPA that removes the situation that caused jeopardy, you can't have a requirement or an RPA that goes beyond what's necessary for recovery. It's going to be a difficult issue that gets worked out probably this winter but I think it's a big difference between our perspective and the NPS perspective is that we feel only one spawning aggregation is necessary to avoid jeopardy but we'll find out this winter and future consultation with the Service. (Capron)

Mary reminded the TWG if they accept the recommendation from the ad hoc group, they don't have to make a choice between the two, but rather are making an assessment as to scientific or technical credibility.

Q: *If this was not occurring within a National Park unit, would you have made different recommendations and conversely did you use any of the NPS legislation in crafting the targets? (Balsom)*

A: *We didn't specifically consider them. We dealt with coming up with targets for the MOs. (Capron)*

Q: *So it was done in isolation essentially? (Balsom)*

A: *Yes. (Capron)*

Q: *Being that the topic is sort of no second population, I wonder if Shane and Melissa took into consideration this plan from GCMRC regarding a second population that was written in 2000 by Rich Valdez, Douglasses, Ryel, and Dave Wegner? Did you use this because it's a pretty good report? It talks a lot about the risks involved to the second population. It talks about the tributaries and that they're basically not suitable for chubs, they're way too small. Even Shinumo is only 4% of the volume of the LCR. I was wondering if you guys really looked at this and whether you considered any of the risks. To get that mainstem population, this report says you've got to have the TCD. It also says that if you do warm the water you run the risk of inbreeding of all those aggregations. In general, did both of you use this report on a second population? (Steffen)*

A: *Yes, that report is out there. The main conclusion in that paper is that to really develop a viable second spawning aggregation it would have to be in the mainstem. I don't know about the TCD. There's lots of things you can do in the canyon to increase the viability of a species, to decrease your risk of extinction. The question is what may be necessary and what this program should do and that's the difficult policy question that's going to get into issues from the Park Service, etc., but our proposal is to not go that extra route of trying to develop that second spawning aggregation is clear and the research behind it is that it isn't required to get to recovery. I think everyone knows trying to develop that is going to be difficult. (Capron).*

R: *Yes, I looked at the report. That's why we're looking at the 30-mile. Yes, one of the conclusions is that you would need a TCD. There are a lot of things to improve conditions in the mainstem. No, we didn't include the TCD. We thought it would be included in the HBC Comprehensive Plan. (Trammell)*

C: *The TCD is an action and we were tasked with targets. (Capron)*

Q: *I question the numbers used in the 2002 recovery goals and that seems to be where you're coming from? There was a lot of discussion on the words used in developing the goals. You've taken the word "viable" and used a particular definition but the point I'm trying to make is that in the context of NPS management policies -- you go to the vision and principles, etc, by your taking that definition, it ignores that other body above it. (Johnson).*

A: *The 2100 number in the recovery plan is based on genetic viability and ... buffer against population changes. There are a lot of definitions on viability and it involves risk. In making those management policies, what types of things do you want to be viable against, dependent, or where they are. Science can take you so far but then management comes in. (Capron)*

Q: *The use of the word "viable" is not the way you're using it and not how it is being used in the recovery goals. The use of the word "viable" was meant to take everything that's in the management policies and boil it down to one word and so basically what it meant to me is meet the NPS goals for native fish which includes abundance and distribution and a whole a bunch of things that are in those policies. So the question always was: how do you summarize this huge body of material and policy down to one or two words. As I understood it, the concept was we were not going to worry too much about that because we know all these other things needs to be met. I think you've taken it and very narrowly*

defined it which maybe makes sense from the perspective of ESA and ESA only, but it doesn't make sense when you're in a national park then it's got to be in the context of NPS resources and values. (Johnson)

Mary Orton said there was a comment made that not everyone agreed that all applicable laws were addressed sufficiently in the targets, but the ad hoc groups still were able to say that on a scientific and technical basis that they were credible. She asked Rick if he had any concerns from the scientific and technical side.

R: *I seriously question all the numbers that went into the models that created the 2100 NVP, but I'm not sure this is the time to argue about it since the recovery goals are currently being revised. It's not clear to me that anything that's in there you can say is based -- okay, 2100 is a rock-bottom number. I wouldn't disagree with you but there isn't a number that's out there that's really particular to HBC. Now you can go to the Reed paper and say okay they took 102 species, this is what they came up with and they say something like 7,000, but I don't think Reed would argue that you could take that number and apply it to HBC. For example if you look at the species that are in there, they're almost all various mammals, some reptiles and amphibians, there's brook trout might be the only fish that's in the whole thing. Well how applicable is that to HBC? I think what we've seen in the literature over the last couple of years is the ratios for fish tend to be much, much lower than for other taxonomy. I think that's becoming more clear as additional data comes in. (Johnson)*

R: *You can't really address that issue until you look at the details of the species you're dealing with, until you do a BPA specific to HBC addressing the issues specific for this species. You're never going to be able to come up with a really satisfactory goal that you're talking about. I worked on those and developed BPAs for those species and it's very data-intensive and that data just isn't available here. Although it would be great to do, the best thing we can do is look at other species and try to take a look at what's been done there and try to relate that here but no it's unsatisfactory. (Capron)*

C: *Well, I wish they would quit using the 2100 number because as Tom Czapla mentioned, it does not apply to Grand Canyon HBC and it was created for the upper basin HBC so if we could quit talking about 2100. (Christensen)*

Q: *In the WAPA proposal, there's not a mainstem requirement for a second spawn aggregation? (Garrett)*

A: *No. (Capron)*

Q: *I think the difference on the spawning aggregation is how you address the threat, right? Would you agree with that? It seems that the NPS is saying that diversify the geographic range, establish other spawning locations, and you're saying no you don't have to do that but you have to address the threat up at the bridges. Am I correct in that? So you're both trying to address the threat. It's just how you're coming at it that's different? (Kubly)*

A: *I think it's more than threat because I think the NPS relies a lot on the 1994 BO with the RPA that requires a second spawning aggregation so they're going back to the RPA saying that's a hard and fast requirement today where I think our perspective is, okay, if you could just look at the recovery plan, there's not a requirement for a second spawning aggregation. There is a requirement to deal with threats to the LCR. I think by advocating a target that dismisses the second spawning aggregation, highlights the need to address the largest threats to your own responding aggregation which are addressed in the recovery plan and I think will be addressed further in the Comprehensive Plan. I think if this program is going to target one spawning aggregation, you have to do that with the knowledge that you're going to have to address those high threats to your own spawning aggregation. (Capron)*

C: *Kerry said why can't we stop talking about this 2100 number. Well, we can't because it is a specific demographic criteria in the recovery plan so you just can't make it go away. I've had my fair share of a lot of Rick's concerns about the fundamental validity of the 2100 number and I think there's 20 years or literature that refuted this and how it was based. Anyway, how comfortable do you feel with the 2100 number? You talked about a viability including environmental demographics and genetics, but the 2100 number really only incorporates genetic concerns. (Randy Van Haverbeke, FWS)*

Q: *Did you ask was I comfortable with 2100? (Capron)*

Q: *How can you be comfortable with the 2100 number? (Van Haverbeke)*

A: *Well, we're not that's why we proposed 5600 and for the reasons we outlined in our proposal. I don't think it does take into account some things that you can take into account when you talk about risk and that's the policy part. It's how much risk are you willing to accept. I would say that 2100 is a relatively risk prone proposal for a minimum viable population. It doesn't mean it's improper. It's relatively risk prone because it didn't really consider a lot of long-term other things you could consider. You could make the number very large and say its very risk reversed and somewhere you have to make the policy call. (Capron)*

C: *One point I want to make today is that it's kind of a plot today the concept that we need to have a second spawning aggregation. It was part of the 1995 RPA, the jeopardy biological opinion and I would like to point out that the biological opinion is still there. It hasn't gone anywhere but we are in the midst of consultation with Reclamation on operations of Glen Canyon Dam so the fact that we're in the midst of consultation with a lot of overlap between the current proposed*

action and the proposed action of 1995 and because we're in the process of revising the recovery goals, I recused myself from the proceedings of the DFCAHG because there are number of assumptions made in both sets of DFCs that I construe as being pre-decisional. They talk about the outcome of future biological opinions and about the potential outcome of the revision of the recovery goals, and I see those things as being pre-decisional so I feel like I can't support these sets of DFCs for that reason. With regard to the second aggregation, I thought it was worthwhile to point out that there is this question in the 2002 recovery goals and I think that we'll still have a lot of this in the revision in that there is a requirement to look at the needs of other species in the mainstem. In other words, you have to look at the qualities in terms of water quality, flow, temperature, and what will get you down to that goal to provide for all the life stages of HBC in the mainstem. You're never really going to get away from that and from what we've seen in the last few years in terms of the changes, we've seen to the population and its improvement. We've also seen that the aggregations have apparently improved as well. The 30-Mile had some successful recruitment and we think even some over winter survival. Again, as Melissa pointed out it looks like we've seen some improvement in Little Granite Gorge as well that might be consistent with this overall group. You may not be able to meet your demographic goal even as Shane presents it but there is a lot of good information on what they've done and I want to acknowledge Shane's hard work. I don't think you can meet that demographic goal without paying attention to the mainstem. It's logical to me that you would also try to manage these mainstem aggregations to reach your demographic goal. I think that while it may not be a specific requirement of the recovery goals, it still is a worthy goal but not only for that but also to address this idea that we need some security against the loss of our main aggregation in the LCR. (Knowles)

R: I think as far as the mainstem goes, that's part of why we added the assumption that all the HBC would be caught in the mainstem because there may be additional need or growth. Once required to be done, that's what will play out through the LTEP. I assume that these targets are for the LTEP and that will play out through all that analysis that has to be done in order to meet these goals. (Van Haverbeke)

Mary asked if there were any comments or concerns with regard to the scientific and technical credibility of the WAPA HBC targets and specifically asked Rick Johnson if his concern about the 2100 number was adequately addressed.

Q: So the power switch goes on, is that right? I apologize that I don't have a succinct question here but I guess I'm trying to express a discomfort and the discomfort is the way you define what's scientifically and technically credible and the reason for that is, what is credible or however you want to think about it, depends on the context that you put the question. So if you very narrowly define the question, you can come up with a lot of things that might be scientifically and technically credible but it's not appropriate for the situation. That's the point I want to make and actually to jump ahead a little bit, I would push the Park Service from the same perspective and that is one of the things in the management policies is to push natural systems as close as possible to natural conditions. We're coming up with numbers based on various ideas of what is viable or what is possible but nobody, at least I'm not hearing anybody saying what we've done is we've looked at - this is as close as we can get to a natural condition and therefore that's the number that makes sense, right? And so what we've said instead is okay, here's where we're at and we can push it a little bit and that's good and everyone would agree that's good but is that pushing it enough? I don't know and until I know what it means how far we can push the system, I don't know what numbers the most credible number. (Johnson)

Mary said that if that's a technical or scientific consideration, as opposed to a policy decision, she doesn't think there's a bright line. She said it seems like Western started with the ESA which is at least political, law, or policy. The Park Service certainly didn't discount the ESA but also took into account and had a much stronger emphasis with the Park Service Organic Act and the Redwoods Act and the regulatory structure that the Park Service operates under, and then they moved into science. She said she had conversations with both Dennis and Matthew about what it would look like to have targets that were solely technical, that had no grounding in policy or law. In talking with Matthew, he pointed out the minimum for survival and the maximum the habitat could support and anything in between would have a policy component. So those two organizations started with a policy construct and then moved into science and developed a rationale. She said both sets of targets were uncomfortable for half the ad hoc group because they didn't like the end result but the question was: Is this scientifically and technically credible? She then asked Rick if he wanted to provide any language. She said not everyone agrees with all the assumptions nor do they agree that all the applicable laws can be met so those caveats are already in there. She asked the AHG members if she was correct that they were put in there as a marker for the AMWG's policy discussion.

Q: I have a process question. The ad hoc group has developed recommendation language that suggests the TWG would immediately move these scientifically and technically credible recommendations to the AMWG. The way the

program is structured is we have a science group, GCMRC, and science advisors who are looked upon as being probably better determinants of the scientific and technical credibility than we as a group are. Did the ad hoc group consider enlisting GCMRC and even perhaps the science advisors in a subsequent review to bolster their claim that both of these recommendations are in fact scientifically and technically credible? (Kubly)

A: Yes, we did discuss that and we're going to make a recommendation here today that they did get peer reviewed either by the science advisors or an independent panel of experts. (Henderson)

Mary said she didn't recall the DFCAHG coming to that agreement about peer review. It was something the Park Service was going to recommend but there wasn't time. She reminded them that the AMWG charged them to forward a recommendation by December but the AMWG didn't meet in December which put them in sort of a conundrum.

C: The science advisors were approached by Ken McMullen. I think he chaired the DFCAHG. I think he cleared a space in December to review this and it's been a prospectus to the Center to do that. (Garrett)

R: Oh really? Did anyone on the ad hoc group know that? I wasn't aware of that. I think that's great. Ken has been reassigned and so he hasn't been around. Maybe he did that and then forgot to tell us. (Orton)

C: And we might have a window that we didn't have at the time we started as well. As John said this morning, LTEP seemed to have been moved back some distance. We don't know how far. John said January or February instead of December which sounds like 1-2 months. John knows much more than I do. Does the group think it would be a benefit to do that then we can come to the question of do we have time to if the decision is made? One thing to consider might be to take these to the AMWG with some recommendations on what should happen next and maybe next is send them out for peer review. I guess from my standpoint I'd like to bounce these off the AMWG and get their reaction before we go too far down the road and find out that this isn't what they're looking for and these things end up dead on arrival. (Kubly)

The members discussed what the next steps should be and said it would be important to have a peer review associated with it along with direction from the AMWG on how to consider this and the other resources in the AMP Strategic Plan. The following recommendation was offered:

The TWG forwards to AMWG the DFCAHG Report (attached), recommends that it be peer reviewed, and asks whether this report fulfills

a) the charge from the Bureau of Reclamation for the LTEP, and

b) can serve as identification of targets for MOs in the AMP Strategic Plan.

The TWG further recommends that the TWG be charged with developing a range of options for targets for the remaining resources in the AMP Strategic Plan.

Rick Johnson proposed the following language:

The TWG recommends to AMWG that it request NPS and the tribes with land ownership in the CRE to develop DFCs and provide them to the AMWG for comment and advice.

There was further discussion with members offering the following concerns:

- There are more laws than NPS and tribal ownership. The USBR, WAPA, and other federal agencies also have responsibility on what happens in the river. (Seaholm)
- The DFC is a NEPA term and a NPS term. I think Randy's thought was the LTEP NEPA compliance and that might be different from the Park Service on how they manage their land. (O'Brien)
- The workshop held last was the genesis of the LTEP and that's why the two key resources were chosen. (Kubly)

Mary asked if there was support for Rick's proposal. There was no response. She asked if the group wanted to hear the rest of the report and then discuss the following recommendation:

The TWG forwards to AMWG the DFCAHG Report (attached), and notes that TWG anticipates further discussion and comment after receiving feedback from AMWG. TWG also recommends that it be peer reviewed, and asks whether the report
a) fulfills the charge from the Bureau of Reclamation for the LTEP, and
b) can serve as the initial identification of targets for MOs in the AMP Strategic Plan.
The TWG further recommends that the TWG be charged with developing a range of options for targets for the remaining resources in the AMP Strategic Plan.

Melissa Trammel provided NPS remarks on sediment and Shane Capron presented WAPA's comments on sediment.

Mary said the plan for tomorrow would be to address the comments offered by WAPA and NPS and develop a recommendation to the AMWG.

Adjourned: 5 p.m.

Glen Canyon Dam Technical Work Group Meeting
December 4-5, 2007

Conducting: Kurt Dongoske, Chairperson

December 5, 2007
Convened: 8 a.m.

Committee Members Present:

Mary Barger, WAPA
Cliff Barrett, UAMPS
Charley Bullets, Kaibab Band of Paiute Indians
Kerry Christensen, Hualapai Tribe
Jonathan Damp, Pueblo of Zuni
William Davis, CREDA
Jay Groseclose, NM Interstate Stream Comm.
Norm Henderson, NPS
Amy Heuslein, BIA
Rick Johnson, Grand Canyon Trust
Robert King, UDSR

Glen Knowles, USFWS
Dennis Kubly, USBR
Anthony Miller, Colo. River Comm./NV
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:

Steven Begay, Navajo Nation
Christopher Harris, Colo. River Board of Calif.

John Shields, WY State Engineers Office

Alternates Present:

Jan Balsom
Don Ostler

For:

Ken McMullen, NPS/GCNP
John Shields, State Engineers Ofc./WY

Interested Persons:

Matthew Andersen, GCRM/USGS
Glenn Bennett, GCMRC/USGS
Mike Berry, USBR
Shane Capron, WAPA
Lew Coggins, GCMRC/USGS
Helen Fairley, GCRM/USGS
David & Pam Garrett, M³Research
John Hamill, GCRM/USGS
Dawn Hubbs, Hualapai Tribe
Stewart Jacks, USFWS

Loretta Jackson-Kelly, Hualapai Tribe
Leslie James, CREDA
Lisa Leap, GRNP
Ted Melis, GCMRC/USGS
Anthony Miller, Colo. River Comm./NV
Mary Orton, The Mary Orton Company
Ken Rice, USBR/GCD
Dennis Stone, USFWS
David Topping, GCMRC/USGS
Randy VanHaverbeke, USFWS

Meeting Recorder: Linda Whetton, USBR

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.

DFCAHG (continued). Mary said she spoke with Randy Peterson this morning and he said to stay the course, that December is the deadline, and to stay the course. He also expressed his appreciation for all the

hard work of the DFCAHG and the TWG. Based on yesterday's discussion, she provided some recommendation language for the TWG's consideration:

The TWG forwards to AMWG the DFCAHG report (attached) in partial fulfillment of the charge from the BOR for the LTEP.

The TWG also recommends that AMWG complete the AMP Strategic Plan by developing targets for all Management Objectives. If this recommendation is accepted, TWG further recommends that

- **TWG be charged with recommending targets to AMWG, and**
- **The humpback chub and sediment targets in the attached report be peer reviewed, and**
- **TWG be directed to further consider the Humpback Chub and sediment targets after receiving comments from AMWG reviewers.**

The members offered the following concerns:

- *Should AMWG review it before the Science Advisors review it? (Persons)*
- *My comment yesterday was that the NPS targets above bypass tube and turbine capacity are not technically feasible because if you go to 60,000 cfs which utilizes a 120,000 acre-feet a day, and for a 60-hour test, amounts to about 300,000 acre-feet or about half of a monthly delivery. Furthermore, given the damage that occurred to the bypass tubes or to the spillways 1983 and 1984, I believe it's Reclamation's policy not to use to the spillways unless an actual emergency takes place. (Seaholm)*
- *The sediment targets both short-term and long-term look like - now these are dam operations which I assume does not mean experiments which means that we're using BHBFs most things as management tools or actions which puts in a whole new ball game as far as hydrologic trigger and the law of the river go. My point is using them routine is a management action not an experiment. You can experiment a couple of times but you can't do it forever. (Barrett)*
- *This is something that I didn't bring up but I did pull up the Colorado River Management Plan EIS to look at the beaches just to see when we were writing our own sediment piece to have a better understanding. There were three sizes of camping beaches that were identified in the EIS, small, medium, and large. And for large camps, in 1983, there were 324 and now there are 55. I question the feasibility of bringing beaches back from now it's 55 to 324, and I just don't think that's technically feasible. (Barger)*
- *The issue was that in 1983 and 1984 the grain size in the river coarsened considerably so fine grains are important because they transport nutrients in the system especially phosphorus and focusing on large beaches made of coarse grain is detrimental to the long-term nutrient budget of this system. (Stevens)*

Mary said it was her understanding the group was looking for something to go to AMWG that would address two issues, 1) the charge from the BOR which would just forward the ad hoc group report and, 2) that TWG thinks AMWG should undertake finalizing the Strategic Plan. They would send it back to TWG to finish the targets, the HBC and sediment targets would be peer reviewed, and further consideration would be made on the HBC and sediment targets along with all the others. She said she spoke with Randy Peterson last night for feedback and he told her that he thought if the report was sent for peer review, there should be some pretty specific direction to the Science Advisors or GCMRC or whoever is going to do the peer review. For example, he said "well, if one set of targets says 5,600 and another says 10,000, what would not be terribly useful is for the peer reviewers to say no 8,000 might be the number. Randy said it might be more useful to have the peer reviewers determine whether they are scientifically and technically credible based on the tests that have been set up on what is scientifically and technically credible means and also maybe an evaluation of those criteria on whether they are scientifically and technically credible.

The members discussed at length the wording of the recommendation language that Mary had drafted. They questioned: 1) if the report should go back to the Bureau of Reclamation since the formation of the DFCAHG was at the request of Randy Peterson, 2) if the TWG should recommend the AMWG completed the Strategic Plan, 3) if it should be sent out via e-mail since the due date to the AMWG was December, 4) whether it should be sent from the Secretary's Designee since that's the line of communication from the TWG Chair to the chair of the AMWG which is the Secretary's Designee, and 5) general wording changes. After further deliberation, the following motion was formally proposed:

Motion proposed by Bill Werner
Motion seconded by Larry Stevens

The TWG forwards to AMWG and the Bureau of Reclamation the DFCAHG report (attached) in partial fulfillment of the charge from the BOR for the LTEP.

The TWG also recommends that AMWG complete the AMP Strategic Plan by developing targets for all Management Objectives. If this recommendation is accepted, TWG further recommends that

- **TWG be charged with recommending targets to AMWG, and**
- **The humpback chub and sediment targets in the attached report be reviewed for financial feasibility, and for scientific feasibility by the Science advisors and GCMRC after review and comment by AMWG, and**
- **TWG be directed to further consider the Humpback Chub and sediment targets after receiving comments from AMWG and reviewers.**

Representative	Stakeholder Entity	Vote	Representative	Stakeholder Entity	Vote
Bill Persons	Arizona Game & Fish Dept.	Y	Rick Johnson	Grand Canyon Trust	N
Amy Heuslein	Bureau of Indian Affairs	Y	Larry Stevens	Gr. Canyons Wildlands Council	Y
Dennis Kubly	Bureau of Reclamation	Y	Mark Steffen	Federation of Fly Fishers	Y
Mike Yeatts	Hopi Tribe	Abstain	John O'Brien	Grand Canyon River Guides	Y
Kerry Christensen	Hualapai Tribe	Y	Bill Werner	State of Arizona	Y
Jan Balsom	NPS-GRCA	Y	Christopher Harris	State of California	absent
Norm Henderson	NPS-GLNRA	Y	Randy Seaholm	State of Colorado	Y
Steven Begay	Navajo Nation	absent	Anthony Miller	State of Nevada	Y
Jonathan Damp	Pueblo of Zuni	Y	Jay Groseclose	State of New Mexico	Y
VACANT	San Juan Southern Paiute		Robert King	State of Utah	Y
Charley Bullets	Southern Paiute Consortium	Y	Don Ostler	State of Wyoming	Y
Glen Knowles	U.S. Fish & Wildlife Service	Abstain	Bill Davis	CREDA	Y
Mary Barger	Western Area Power Admin.	Y	Cliff Barrett	UAMPS	Y
			Total Yes		20
			Total No		1
			Total Abstain		2
			Total Voting		21
			Motion Passes		

Update: The Desired Future Conditions Report was transmitted by the TWG Chair via e-mail to the BOR and AMWG on January 7, 2008 (**Attachment 5**).

Sediment Update. Ted Melis passed out copies of his "Summary of Sediment Synthesis" PPT presentation (**Attachment 6**). Ted said this information has nothing to do with the recent inputs but information that has been gathered over the past 2-4 years and was shared specifically with the DFCAHG over the past month. He talked about the results from several of those reports.

Q: *In the SPG process we talked about a new trigger which is proposed but we also talked about something called conditioning flows to distribute the sediment through the system. That second part doesn't seem to be getting much attention right now. Where do you think we are in terms of having the sediment distributed away and where would we like to have it distributed for a BHBF? (Kubly)*

A: *That's a really good research question because what we like to think about is that these point sources come in from the Paria or the LCR kind of like when you first cut off a lump of butter and you lay it on your toast and then you work with your knife to spread it around. We like to think that normal operations that are MLFF could be that night but what we're finding though, based on some data that we're looking at, is that the pile of sand that's located immediately below the tributary confluence where the material comes in acts as a source for ongoing downstream transport and it's really suspended transport that dominates in the system as opposed to bedlam. So you'd like to think of the flows acting as a knife spreading that pile of sand along the channel more uniformly but what seems to be happening, and again this is preliminary, is that pile of sand acts in the same way a dune acts as a source of sand for windblown*

transport. You might see part of that sand distributed on the bed but a lot of it is actually being carried in suspension all the way through the system downstream. We're seeing some reaches actually under enrichment upstream like the reach between Mile 61 and 87 not benefitting in terms of accumulation of any sand from upstream sources. The sand seems to be taken up into suspension and moved through reaches like that without depositing anything on the bed so that's a little bit discouraging. When you see multiple inputs occurring from the Paria and the LCR, what you'll hear Dave Topping and others say now is there is more sand in the system and it's more uniformly distributed but it may not be anything more than the fact that we've had LCR inputs. We've had three inputs. A lot of the flume experimental work that took place in Paul Grams' dissertation research got at this issue too. The pile of sand will actually decrease in its height but not necessarily be elongated because a lot of that material is being put into suspension and it's not falling out of suspension until it gets to Lake Mead. So this idea of conditioning flows is really worth evaluating and has a lot of merit but you shouldn't be thinking that that's going to be necessarily a tried and true approach for trying to get more material distributed through the system before the BHBFs. It may not work that way unfortunately. (Melis)

Q: *Given where your current models are and your predictability knowledge of the BHBFs and knowledge of transports under normal flow operations, is it possible to develop some 20-30-year probability assessments of given a certain structure of expected inputs and flow regimes, including use of BHBFs, to do any test of this hypothesis? Can we manage with flow only and input only regular natural input to the system and what over time under different regimes will we expect as far as residual backwaters and sandbars. That's a big question. (Garrett)*

A: *The short answer is yes. (Melis)*

BHBF Science Plan Update. John Hamill gave a PowerPoint presentation entitled, "Science Plan for a Potential 2008 Experimental Beach/Habitat-Building Flow" (**Attachment 7**). He said there have been some changes in the BHBF science plan. He said the plan has been re-cast from a generic plan to more of a plan for a potential BHBF in 2008. He provided dates for the review/decision making process:

- Agency & Peer Review of Science Plan (Feb-Apr 2007)
 - BOR, NPS, FWS, WAPA, and AGFD preliminary review
 - Independent Science Advisor review
- TWG Review of Science Plan (May-Oct 2007)
- DOI/AMWG Policy Review (Nov 2007 to present)
 - Revise Plan based on TWG/AMWG concerns
- DOI Decision Timeline
 - Dec 3-7: Formal DOI proposal? GCMRC spending authorized?
 - Dec 10-12: Final BHBF Science Plan
 - Dec 07 – Feb 08: Compliance and permitting
 - Mid Feb 08: Final DOI Decision

Q: *It's not just the trout fishing economic impact because you all know that there are those day rafting trips that go from the dam down to Lees Ferry. I think if it ends up happening in March. I'd like to know how soon because there's already reservations being made for those day rafting trips for fishing guides, etc., so it's going to be a lot of reservations canceled and a lot of plans changed. Do you have any idea when we might know exactly when it would be? (Steffen)*

A: *I would hope it would be either this week or next week. We need to know that as well so that we can start our planning. There is a whole river community out there that needs to know. (Hamill)*

Q: *You indicated already you're thinking of several more tests needed in addition to maybe one in March. We heard you think you have the capability to model the physical aspects of deposition of sand and erosion of sand. You have two tests now, one with not much and one with medium and if you do another one, you'll have one with a lot of sand so you kind of have a bracket. Do you not think it's possible that if you do this additional test with a lot of sand that your models can be refined enough so you could actually make the decision about whether this is a viable management tool, at least for deposition of sand understanding that if you decide wrong, that you can change and go back up into there. I'm just wondering why before you even do the next test that you need several more experiments. (Ostler)*

A: *This would follow up from Dave Garrett's question. We could do that today with the existing knowledge we have if the intervening operation between the BHBFs was nothing more than a stable flow regime. We think we can do that. When I said yes to Dave Garrett, I didn't follow up but if you had a stable flow regime in between the BHBFs in the future, we believe with the existing knowledge we have and the models we can predict the outcome of that. When you get into a diurnal fluctuating regime and all the dynamics inherent in that regime, then my answer to Dave Garrett is no. So under very limited, simplified scenarios for long-term projections with BHBFs under sand enriched conditions, an intervening flow operation being stable flows only, we think we can predict the outcome but when you start mixing it up with what's obviously the Record of Decision, a non-stable flow operation, the modelers say we can't tell you over*

10 years what's going to happen because it's so complicated. So the additional need for modeling research is really to figure out what the fate of those inputs will be under a non-fluctuating flow regime, a non-stable regime, as well as the bar dynamics within hundreds of eddies over many reaches and then BHBFs whenever they occur under enrichment. Yes, to Dave Garrett but I didn't get to the rest of it which is probably not very appealing to you folks because the stable flow regime is not what you're necessarily. (Melis)

C: I think Don's question was if we do one more test, would you be able to build a more robust model or would you need to do several more tests in order to develop that more robust model. (Hamill)

R: What's limiting the ability for us to advance the modeling is that if you look at our annual budgets over the last few years, it's a very small budget item. There is a lot more work that's been proposed through the review process and reported to the TWG just in the past summer but we haven't had the funding to really initiate advancement of that work. Measurements that would be collected in the next BHBF test, if coupled with support for that modeling development effort, yes, it will move forward. If you just do the BHBF and there's no additional support for using those data infused into our research development program, then you don't end up with what you want. If you don't do the BHBF and you don't advance the modeling, we can tell you what we think happens but only under intervening stable flows. (Melis)

C: And Don I don't think you're going to be able to answer both questions about use of backwater habitats by HBC, other native fishes, and foodbase. We're not going to answer all those questions so maybe they'll be some elements that can go down we can tell you and evaluate it just from a sand transport standpoint more effectively but there's still going to be other things in that experimental mode. (Hamill)

Q: I came here to ask a question on how Native American perspectives were going to be incorporated into some type of a format to where we do address concerns and issues that the tribes have as far as results from the BHBF prior to and after. Back in 1996 we were offered an opportunity to conduct studies, pre- and post- BHBFs. We turned in a full report to the Bureau of Reclamation called "mitigation and monitoring of cultural resources in response to the experimental habitat building flow in Glen and Grand Canyon dams spring of 1996." Back then, since this was a new undertaking, which also considered this as an undertaking by the federal agency that we had concerns about various traditional areas in the canyon system, so we were looking at the Gooding's willow at Granite Park and a lot of effort was concentrated on stabilizing the base of the Gooding's willow. The Gooding's willow was recognized as an historic area because John Wesley Powell was shown taking a picture in front of the tree and including the oral histories from the Paiute and Hualapai Tribes, saying that this was an area that they used to all gather at to renew kinships and also create social networks within the aboriginal tribal system. In looking at places like that we also articulated that the resources that were important to us were also important to be noted within the some type of scientific structure and we looked at ethnobotanical resources and I know that back then we had different types of botanists out there looking at the riparian area and it seemed as if maybe we were duplicating each other but in reality I think from a tribal perspective, we were looking more at how these flows would affect culturally sensitive plant resources and so the Hualapai Tribe went and established five study sites in National Canyon, at Granite Park, Diamond Creek, Bridge Canyon, and Spencer Canyon so it included the upper portion of the reservation line all the way down to the lower portion. I think our studies that we did back then is something that I would like to see continue in these studies and I think that other tribes should have the opportunity to also include their input if they wish to. This is something I talked with Brenda about during a conference call and she suggested I come here and give my input to this overall plan that you have presented so everybody knows who is going to be here to save it and I just want that recognition that the tribes do have a basis of doing their studies and that we want to be afforded an opportunity to continue on with these studies. We've been working with the Bureau of Reclamation in doing our monitoring program and we're not asking for extra funding, but we want this recognition that we need to do this pre- and post- BHBF, if it does occur. If anybody else wants to have input to what I'm saying, go right ahead. (Jackson-Kelly)

Q: Do the other tribes have concerns about resources that need to be addressed as part of this study effort? (Hamill)

C: I talked with Charley Bullets about this since the Paiutes use the same botanist for our studies. I had talked to him about the future monitoring that we wanted to do with the resources and suggested that we work together to share the botanist so that when he goes down the system, he can do both assessments for the Paiute and Hualapai at the same time. We're always trying to find ways to save funding because we don't have a whole lot of money and there's not a whole lot of money given to our future monitoring program. It seems as if we're the ones stressing and trying to do this buddy-buddy system going down the river and I talked to him about that. Back in 1996 the Hopi Tribe was involved with the sediment portion. Paiute were involved with the ethnobotanical and some sacred sites and so were the Hualapai involved in the same. We were concerned about various points along the river corridor where there are sacred sites and a 45,000 cfs would impact those specific site areas. (Jackson-Kelly)

R: I could have Helen sit down with you after the meeting and talk about what your specific concerns are and perhaps work that into our study plan. (Hamill)

C: Because there is a riparian vegetation study in there, it's number 2 in the plan. So if you have chance to peak at that, you might see if it addresses part of your concerns. (Andersen)

C: *We do have a vegetation study and there may be a way we can modify that to help address. Helen is shaking her head no. (Hamill)*

C: *I'm shaking my head because when I hear Loretta saying that there are very specific locations of concern for the tribes whereas the vegetation study that's being proposed is looking at effects to certain communities of plants in the corridor as a whole using random sampling, that's been an ongoing (Fairley)*

R: *I think there's a difference between Western science practices and traditional ecological knowledge. We have very specific areas and there was always the conflict with trying to work with the researchers in riparian areas because they were randomly selected whereas we were looking at real specific locations that were associated with traditional cultural places. (Jackson-Kelly)*

C: *I suggest we have discussion afterwards and see where we can try and integrate your work into some of our study efforts and see what we can do with the rest of those issues. (Hamill)*

C: *And we did establish the site prior to the 1996 flows and it was in response to the 1996 flows and to use that - I mean that's 11 years ago and that's valuable data that we can build on. We keep talking about baseline data. We keep talking about building on what we've studied before so that we can continue doing this and being able to see the progress or whatever, the negatives. It's a perfect model to pursue I believe. (Jackson-Kelly)*

MOTION (proposed by Larry Stevens): **“TWG finds that the GCMRC’s BHBF Science Plan revised in December 2007 and including the TWG comments provided to GCMRC during this meeting, and the presentation of that plan, to be scientifically adequate to evaluate the results of a 2008 BHBF.”**

C: *Larry, I'd like to see the plan and the changes to it. (Barger)*

R: *That's fine. It's just that for us to proceed with this decision making, but having some statement from this body is important. (Stevens)*

C: *I can't accept that motion either absent a few other questions that were raised in my interview. It seems that in the HBC questions you had, the definitive information would be fish counts before and after the test and those weren't in there, or weren't in the Executive Summary. I couldn't really endorse the plan until I saw them and if those counts were in there. That seems to be the definitive information that is needed. And then I have some concern that there's been a little bit of nebulous discussions about where the funding of the test will come from. I know we just saw a little bit of information there on which you had in that experimental fund and saying that other funds may be committed but I think in discussing that previously, it became pretty apparent that there's a good possibility the budget that AMWG had approved not too long ago could be a source of funding for the BHBF test. Having said that, I still need more information about what information or testing may be foregone if we do the BHBF. (Groseclose)*

C: *I thought the TWG had already approved the BHBF plan subject to some changes that were recommended. I wasn't at the last meeting but I think that was the procedure that took place so I'm not sure the motion to approve it again is appropriate here. We've already approved it and sent it on with changes. John reported back on the ones that are going to be changed and we haven't even seen it so there's nothing really to vote on but I think we've already done our duty. (Henderson)*

C: *Well the presentation here to talk about the long-term implications of this BHBF in relation to high flows management overall and that part of it has been worked up and is new to this plan. The scope of that I think in the presentation that John made was useful and deserves some attention. (Stevens)*

C: *I'm not sure anybody has asked us to approve this report or even asked TWG's opinion on it. It was presented to us as a matter of information and I'm happy with that. If asked to vote on whether I would approve and accept this report, I'd have to say no because there's parts of it which deal with way into the future, long-term BHBFs as a management action when we think there may be other things that we can do to save sediment. I'm just not willing to vote for a thing like this especially when we don't have to. Why are we bothering? (Barrett)*

C: *I withdraw my motion. (Stevens)*

Cultural Resources AHG Report. Mary Barger said that when the budget was passed at the last AMWG meeting, there was an addition to the motion that stated “direct the CRAHG to review the GCMRC Cultural Resources FY08 Budget.” She wasn't quite sure what that charge meant so she set up a meeting between the CRAHG and Helen Fairley to go through the FY08 budget. Since the FY08 budget was already approved, it didn't make sense for them to do a full critique but rather look at the 08 budget in terms of making recommendations for the 09 budget which would be a better use of their time. She said they went through Helen's 08 budget workplan and each of the line items and discussed them in terms of informational purposes, where they were, what was going on, why they were doing what they were doing, and were they multi-year projects. She passed out the CRAHG's recommendations (**Attachment 8a**). Sje said she realized that some people were concerned about not getting regular updates and that they also

wanted to see reported. They understood the peer review issue but also wanted updates on projects at TWG or CRAHG meetings. She said they discussed bridging information on projects in that that sometimes they couldn't see how projects were related or that the geologists were working on some of the geomorphological erosion stuff and weren't working directly with the archaeologists. Because NPS, GCMRC and USBR were all doing different things, the CRAHG didn't feel it was the best of integration for those three groups. So the CRAHG thought that if the USBR is initiating treatment this year, then perhaps they have the data from the other efforts that are happening in order to do the best job they're doing as an example. Some of the programs they looked at were the Legacy program and the checkdam study that was being done by Utah State University by Joel Pedersen. She said that Helen has been working on getting up the long-term monitoring program, doing the R&D on long-term monitoring, weather monitoring stations down in Grand Canyon that John brought up, and a LiDAR study for monitoring purposes. Mary reviewed the nine recommendations from the CRAHG. She added that Mike Berry agreed that Reclamation would provide the consultation as requested in #6 and in reference to #8, he is also working on the Tribal Consultation Plan which is suppose to have some guidelines on how consultation should even be taking place within the program. There was still a concern by the tribes that GCMRC should've been more responsive to that concern.

Mary said that since the AMWG directed the CRAHG, an ad hoc group of the TWG, this effort fell into a gray area. She said Dennis told her that since the CRAHG generally responds to the BAHG and this is a budget issue, they had a BAHG phone call to address their concerns and process requirements. Dennis said he thought they had agreed and the CRAHG issues would be included in the 09 budget development process. Mary said when the CRAHG met with Helen, they asked her when the 09 projects for the 09 budget would be available for review. Under the old schedule it would've happened in January but because of all the other things that are going on, the CRAHG thought that was unlikely. The CRAHG is still looking forward to having that discussion with Helen.

Helen passed out copies of her responses to the CRAHG's concerns (**Attachment 8b**) but Mary said neither she nor the other CRAHG members had had time to review them and weren't sure what to do next because this had never happened before.

TWG Calendar for FY08. Kurt passed out copies of the 2007-2009 Program Schedule (**Attachment 9**) and said he'd like the TWG to have a discussion on what they plan to accomplish in 2008. He reviewed the legend boxes and said that with the development of the 2009 workplan and budget and WY09 hydrograph, that perhaps January or February would be the first time the workplan and budget for 09 would come out. Dennis said that the typical starting point for working on the budget began with input from the CRAHG, GCMRC bringing a draft budget, and getting a discussion going with the BAHG for the development of draft budget by March or April AMWG meeting, and then a TWG recommendation in June or July for an August recommendation to the Secretary.

John said that schedule works if there isn't a BHBF scheduled. He said his vision was that GCMRC would produce an annual report sometime in February that would summarize the results of what had been accomplished in 07 and recommendations from the principle investigators about what they ought to be doing in 08 and 09. There would then be a discussion with the TWG about the substance of those recommendations. And then based on that, there would be what GCMRC calls a "program guidance list" in which they would lay out the budget in more general terms. He said a lot of the projects in 09 are likely to be continuation of things in 08 and he thought 2009 would probably be a transition year given where we they are in the LTEP process. As a result, March is when he thought the first preliminary draft of the budget and hydrograph would be available. He liked the idea of having the discussion about the hydrograph early in the calendar year instead of always putting it at the end so the workplan and budget can be built around it.

Responding to a question on what he would do with the budget and workplan if there was= a BHBF, John said if a BHBF were done in March, GCMRC's ability to focus on next year's budget would be really limited. He hasn't had that discussion with his staff but feels they'd put together a crash effort beginning in April in

order to prepare next year's budget. He said he like to consider whether or not the idea of having an annual report and a session with the TWG to review the substance of those reports and talk about what was accomplished and what the shortfalls were in an effort to help prepare the next year's budget. He asked if that was something the TWG might be willing to do as a separate 2-day meeting. He said this was brought up briefly at the last meeting and he got very little response. He doesn't want to produce an annual report if the TWG isn't interested in one.

John said they're somewhat at an advantage in that they have an MRP that lays out the core monitoring schedule and some other activities so they're not starting from scratch. They can look at how much money is going to be available and then it's just a question of trying to figure out how to allocate the available discretionary money.

Kurt reviewed some of the other items listed on the scheduled and said that the Information Needs Workshop on HBC and trout, a sediment core monitoring evaluation report, a terrestrial vegetation report, Lees Ferry Trout core monitoring evaluation report, and a general core monitoring proposal would be submitted to the TWG for a recommendation and would help in their scheduling process. He asked John O'Brien if the Sediment Ad Hoc Group will be prepared to make a recommendation to the TWG at its next meeting and John assured him they would.

The members discussed other items on the schedule which included 1) whether this was a another budget transition year, 2) what projects would slip if a BHBF were scheduled, 3) what projects have already slipped due to GCRM staff being involved in planning for a BHBF, 4) status of the LTEP and what effect it could have on the FY09 budget, 5) asking the AMWG to do a review of the AMP Strategic Plan, 6) develop management objective targets, and 7) status of the Roles AHG Report, 8) Completion of the Programmatic Agreement, 9) Memorandu of Agreement regarding resolution of treatment for 55 archaeological sites, and 10) Review of the HBC Comprehensive Plan by the In/Out Ad Hoc Group.

John added one more item to the schedule and passed out copies of a "Prospectus for the Colorado River Basin Science and Resource Management Symposium" on Dec 3, 2007 (**Attachment 10**). Last week he participated in a conference call with the proposed sponsors which include the Upper Basin Recovery Program, the San Juan Recovery Program, the GCMRC, the MSHCP, the lower basin, the National Park in the basin and the Colorado River Fish and Wildland Council.

Final Report of the Cultural Monitoring Legacy Data Review Panel Helen Fairley introduced Dr. Keith Kintigh from ASU who would present the results of the Legacy Data Review that was conducted as part of the cultural monitoring research and development effort that has been underway for about two years. She said this is one of a series of presentations the TWG will be hearing in the coming months about work that is being done on that project and the progress being made. She said this particular review was not part of the original proposal that had been crafted but it was added in response to some concerns by some of the members of the CRAHG. Helen said it's an honor to have Dr. Kintigh here as part of the review panel because he is well recognized within the field of archaeology as an expert in the application of quantitative methods to the analysis and interpretation of archaeological data. He's also the past president of the Society of American Archaeology.

Dr. Kintigh distributed copies of his report, "Legacy Monitoring Data Review Panel Report to the Grand Canyon Monitoring and Research Center" (**Attachment 11**). He introduced the other members of the panel which included Jeff Altschul, William Lipe, and N. Scott Urquhart. He then gave a PTT presentation. He concluded with the following recommendations:

Define and Prioritize Monitoring Objectives

- Better to address some well than many poorly
- Cleary define concepts employed

Devise Monitoring Plan Sensitive to Goals

- Identify recording protocols and field-test forms

- Employ in a mixed strategy, as appropriate to specific objectives
 - Sampling
 - Varied visitation intervals
 - Controls

Implement Plan

Analyze Data

- Address management objectives and data consistency
- Adjust protocols accordingly

Q: Question on the model, did you consider the work that's being done in individual terrain models that were worked on combined with the sediment modeling? (Garrett)

Q: I don't think we were aware of the sediment monitoring. The digital trail modeling would go along with the LiDAR in that you would stratify your universe in part using that. The data that would come from that would go into your overall geomorphic model where sensitive vs. less sensitive areas are and so forth. I think the sediment monitoring from what I would guess would again bear directly on the validity of different kinds of geomorphic models. I think what we're suggesting is not (inaudible) (Kintigh)

Q: I would like to remind the TWG that this is the kind of finding that resets our approach to understanding these resources in relation to dam operations. Carl Walters when he did the original review of fisheries data concluded that 20 years of fisheries data collection provided some interesting research results but didn't really get us anywhere in terms of understanding long-term population responses of the chub in relation to dam operations and that set up a whole revolution in how monitoring is conducted for that key resource. These results seem to be of the same scale of critique of program data and I think we need to take these results very seriously. You were charged with looking at the legacy data. We have traditional cultural property data and we have ethnobiological data that are important in this system. Have you thought about how to integrate those as well into some of these considerations? (Stevens)

A: We haven't. The TCP issue is certainly one that we're aware of but we didn't in particular address that. I think to the extent that you've got a geomorphic model that helps you, then the idea of having locations, you're going to be able to address many of the same concerns. (Kintigh)

Q: It's kind of nice to see someone take a look at things we've been collecting for a long time although 1992 isn't when the data collection started, but that's when you started looking at the data? (Balsom)

A: I think those are the systematic quorums that we started. (Kintigh)

Q: Were you able to take a look at the photographic records? (Balsom)

A: We didn't look at them. (Kintigh)

Q: Because that's one thing where I keep looking back and saying, okay, for 50 years we have photographs and surely there is some value in those. (Balsom)

A: And I agree and in our report we did go into that. I didn't talk much about it. Of the legacy data those you could in some sense quantify and even though they weren't collected with that in mind but to the extent you got similar views of the same kinds of natural and cultural features, I think you could do it then and I think we concluded that analysis of those could be - of the legacy data, that was the most difficult form of data that was out there and there would be some interesting projects for people to do either as master projects but also conceivably for special people. The questions we got are tell us if we can do this or not and the answer was often we don't even know if we can do that until we spend a lot of effort going through, reformatting the data, looking at a whole bunch of these data, doing some pilot projects, so it's not something you can look at and say yes you can do it or you can't. A lot of people say that we're skeptical that you can do at this level but maybe you can get some distance and we thought a lot of potential was in those terrestrial programs. (Kintigh)

Q: You mentioned the sites we took out of the monitoring schedule, just so you know they haven't actually been removed from monitoring, they have been removed from monitoring in this program, not from being looked at in general. They are still in the Park-based program but just weren't deemed to be appropriate for this program. We've been struggling with the geomorphic models forever since we first started working on that in 1989 to try and develop the Hereford model. I know there have been other models that have been attempted so did you all have the opportunity to take a look at some of the other geomorphic work that was done to try and develop these models? (Balsom)

A: The materials that we saw were mainly were the Hereford model. There was a little bit of discussion but we didn't get into that and I'm not sure that it would help and that's not any of our areas of expertise. There was enough discussion of the Hereford model to say that that wasn't an adequate model. There were some things that we needed more than that. (Kintigh)

Q: The specific data fields that are collected - the fact of the matter is that for years we've struggled in this program with how to actually try to collect data that really does tell you about dam effects and pretty much everyone across the board has said that you're probably never going to get there but nobody has actually said okay, these are the sorts of data that we think you could collect, these are the variables that might be worthwhile looking at. Did you have any discussion on what those might be? (Balsom)

A: Well, I think that's really what comes out of the model. I think the model allows you to make that - the reason, if people are concluding that, is that it's not clear. A particular flow regime doesn't have an effect. It has some complicated set of effects and I think we can only really understand that in the context of a model and I think that's part of our emphasis on really thinking about what the objectives are and then trying to move through a model and getting at what the right variables are and ideally getting quantitative measures of those which is very nice about the LiDAR because you can really see, not just that, there's erosion or that there has been erosion since the last monitoring event but quantitatively to really be able to start assessing those trends. (Kintigh)

Q: Were you provided the information - there was a geomorphic workshop where they had maybe 20 geomorphologists that came together and did make recommendations on what should be done in Grand Canyon for the archaeology. There is some stuff related to what you're talking about? (Barger)

A: No, we didn't review that. (Kintigh)

Q: In terms of the LiDAR, you looked at the LiDAR but there has been a whole bunch of total station mapping done down there. Did you look at that to compare it to the LiDAR? (Barger)

A: That we did look at. We were provided that information as an example. The ideal setting would be to have - one thing the LiDAR doesn't do is it doesn't tell you where the ecological features are. It tells you where there are bumps an gullies and so forth but it doesn't where the features are so the ideal situation would be to have a base map that's liable to be a total station map that actually identifies archaeological features and other kinds of features that you want identified on the sites and overlay the LiDAR on top of that. The total station data seems to me to have a relatively greater impact on the site and my guess is they cost a lot more too. To be able to lay that over would be ideal. The LiDAR data by themselves will give you some help and you can look and see where they are, but the total station data is going to have much less precision in terms of this elevation difference just because of the number of datapoints. (Kintigh)

Q: Some of the sites dropped because it was determined that it was unlikely to have dam operation effects - I mean this program is supposed to be focused on dam operation effects to archaeological sites so it seemed in reading your report that you went outside of the area where there was a potential for dam operation effects. Were you given guidance in terms - because we talk about flow lines for the APE rather than - I'm just curious on how that - (Barger)

A: We didn't feel ourselves all that constrained. We certainly were given some guidance and we tried to focus on and I think the vast majority of our information really does address the APE for the dam operations but we did stray a little bit outside that. That was just to make some - some things that sort of occurred to us at the time that had to do with the overall monitoring program not necessarily just with the one associated with dam effects. (Kintigh)

Q: Mary, this topic also pertains to other resources as well but so often there are interactions that are weak perhaps that affect areas outside the immediate scope of our process, upslope processes, wind, those kinds of things that aren't really directly in the purview of - but at present I think it's just assumed that all impacts on resources are the fault of the dam and there are all sorts of issues that are in addition to that operating on these resources. The model that we're hearing about today is a reflection of the complexity of those other factors here and working those out will give us a clear picture of what is a dam related impact on resources and what is not. (Stevens)

Q: For the time allowed for the proposal, a few months to look at 12-13 years of data, did you actually do any of the erosion impact indexes that you mentioned and were you able to crunch some numbers? (Leap)

A: No, we weren't. We really felt that was beyond the scope really. That would have been a data analysis project and I think the nature of the data was such that that wasn't something one could simply crunch the numbers or pretty directly extract some good indices, it would take a lot of thought, a lot of consultation with people who knew more about the specific variables and the way they were collected. (Kintigh)

Q: For the LiDAR example, for the modeling process we wouldn't have to go and look at every archaeological site so you would be suggesting taking a sample based on geomorphological differences, A, B, C, and D modeling areas so we wouldn't have to go to all this sites and do LiDAR and mapping? (Leap)

A: That's right. And again, this would be an issue of the objectives but I think for assessing the dam effects and for dealing with the models and assessing the models and that iterative process, you absolutely wouldn't need to go to all the sites. There may be other reasons to do - one might decide that for other kinds of site specific objectives, that's a good idea, I mean it gives you some quantitative and you can evaluate the costs vs. benefits of that but in terms of what we saw to be this quite pressing question on dam effects, it would not be required. And again, you could not only take samples of areas, some on-site and some off-site, but also have these different intervals in places that are stable, you might want to sample every 4 years for ones that are pretty active, you might want to sample every year or maybe if you had a particular event where you know some things are going to happen with the dam, you might do a couple of things right before and after, something like that but really focus on specific things. It's really very objective directed. (Kintigh)

Q: You made a number of major recommendations and critical tasks. What's your assessment of where the program currently is in addressing some of those major recommendations, like prioritizing objectives, clearly stating - is it your sense that that's an area where we need to do additional work or are there some deficiencies that popped out that we need to pay attention to? (Hamill)

A: I would say that one of our challenges as a panel was that we were all acronym-challenged and so to answer your question seriously, we really didn't look at the current program. Some of it came out in discussion - I think Chris Down for example is one of the people who came out to talk with us and mentioned the LiDAR and it came up in some other contexts and so there was some inquiry in that direction but we really weren't - I frankly don't know enough about the process where you are in terms of defining objectives. We weren't asked to do that and we didn't do it. (Kintigh)

Science Advisors Review of Cultural Treatment Plan. Dr. Dave Garrett passed out copies of the report "Review of Statement of Work and Relating to Preservation and Protection of Cultural Resources in the Colorado River Ecosystem" (**Attachment 12**). He directed the members to look at the abstract of their findings (second page) and then proceeded with a PPT presentation. He said there's been some confusion with Dr. Fowler and said he wanted to go through some steps involved in the process. The Science Advisors received the request for review during the summer. It was a rather large document of all the work done in 2007 but that request for review was pulled back so they didn't do the review. In October he said he TWG requested the SAs work with BOR and GCMRC to review the treatment plans and SOW. There was a SOW to be released based on two treatment plans ____ 2007 and AMP, et al 2007. The essay prospectus to review this SOW and treatment plans was developed and Dr. Berry had concerns about that over cost and the extent of the essay review. Dave said he released a second SOW to Dr. Berry and John Hamill after he and Dr. Fowler had read it. The SOW was set up to treat the four sites in the Colorado River so Dave revised the SOW and the reason he that was for Dr. Fowler to review. They were going to get outside reviewers to review the treatment plan but the SOW didn't specify the requirement to use any of the information in the treatment plans for the data recovery or mitigation on those four sites so Dave tried to make a decision to keep the costs down and decided just at that time to review just the SOW. He said the review passed out today is a review of that SOW which does not require the treatment plans and the information from them so Dave didn't believe that he or Dr. Fowler had to review those treatments in order to review the SOW.

Q: So you just did the SOW for the four sites for 08? (Barger)

A: Yes, which is not specified for the use of the information from those two treatment plans. (Garrett)

Q: What did they specify? (Hamill)

A: It's an open RFP process. What it really says is that those respondents who respond to this proposed project submit a proposal that has in there their proposed data recovery and mitigation approaches and they can use any approaches they want. It's not constrained is what I'm trying to say by the treatment plan. I felt I could do that SOW review, bring it to you, get Dr. Berry our review on that, and then you and I John talk about we would do a review of the treatment plans later when I have more time. I need four outside specialists including Dr. Fowler so I wanted to have multiple archeologists involved in that review. (Garrett)

C: Just to everyone knows one of the sites proposed for 08 is the site for treatment in the Glen Canyon Reach that would be impacted by the BHBF. So for those of you who don't know that, that is a piece of this SOW which might be one of the reasons it's sort of an abbreviated SOW because of the need for speed. (Barger)

C: In Dr. Berry's defense, he pointed out both the cost issues and the need to move very quickly. We wanted the review done quickly so he could get any information on the SOW, for example, before he proceeded so we tried to do that and move very quickly to get that done. There are 4 sites, one of them is in the Lees Ferry Reach and it was determined by Spurr and Collette to be in the area of impact. (Garrett)

Q: I haven't looked that closely at the SOW but was there anything in there that actually identified why those sites were selected and how those sites were selected or anything along those lines? As far as I'm aware, it didn't actually use any information that has been collected in the past to make this determination. (Fairley)

A: What we did do and what I have to do and what Dr. Fowler has to do is review the documents so even though we're not giving you a review of the treatment plan, we've read the treatment plans. It appears, it's not clear in the SOW, you mean criteria for selection, it appears that the Spurr and Collette when you read them that they have some criteria and so we can see how that one site was selected. As a matter of fact I mentioned that in the overall long review. We did not understand how the other three sites were collected because that document doesn't give specific criteria about selections. Does that answer your question? We're not sure about the 4th side, we're fairly sure we know why the one site was selected but not sure how they other three were selected. (Garrett)

BHBF Update.

Dennis said that several times during the meeting there have been questions about whether a decision has been made on an FY 2008 BHBF. While John has identified potentially there could be a decision very near, he said that no one is aware of whether that decision has been made. He said there is a review and recommendation process all the way up to the Secretary in determining whether to undertake actions like this. He reminded the TWG that Mark Limbaugh created a policy group and they're also part of the decision making process along with advice from the Solicitors. He also said there were several questions asked about the appropriateness of activities that would lead up to this decision and if certain decisions have been made that it is appropriate for example to expedite compliance for the BHBF in order to ensure that they would not foreclose the opportunity to do so in this very short time frame. He stated it's also appropriate for GCMRC to move forward with the development of the contracts to assure that procedures are in place should a decision be made in the very near future. He told the TWG that all AMWG members were surveyed by Ms. Burman asking them for their input. There was also a meeting held at Marble Canyon to get input from the trout guides and other business representatives in that area and the decision has been made that it is appropriate to consider the needs for any mitigation that might be necessary if the decision is made to undertake the BHBF. So the process has moved up to a pretty high level. No decision has yet been made but it does seem to be appropriate to move forward so we wouldn't foreclose the opportunity if the decision is made.

Q: *What does "appropriate to consider mitigation" mean? (Persons)*

A: *There have been certain concerns that have been provided about the timing of a BHBF, effects that might occur on - for example, I know Mark identified that at the meeting with the trout guides. I'm not pointing to anything specific, I'm just saying there are concerns some of which might be appropriate for mitigating actions and it is appropriate for the Bureau of Reclamation in its compliance activities to consider those. (Kubly)*

C: *So my interpretation is that GCMRC has been given the green light to go ahead and start executing contracts and start spending the money. (Hamill)*

C: *You're taking me just a little bit further than I'm comfortable with. There's always that ir retrievable resource thing so it's all right to proceed. I don't know about signing on the dotted line. (Kubly)*

Adjourned: 12:30 p.m.

Respectfully submitted,

Linda Whetton
U.S. Bureau of Reclamation

General Key to Adaptive Management Program Acronyms

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

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