Glen Canyon Dam Technical Work Group Meeting
BIA Conference Room, Arizona Center Building
Phoenix, Arizona
August 2-3, 2006

Conducting: Kurt Dongoske, Chairperson **Convened:** 10: a.m.

Committee Members Present:

Mary Barger, WAPA	Dennis Kubly, USBR
Steven Begay, Navajo Nation	Glen Knowles, USFWS
Kerry Christensen, Hualapai Tribe	Phillip S. Lehr, Colo. River Comm./NV
Jonathan Damp, Pueblo of Zuni	Ken McMullen, NPS/GCNP
William Davis, CREDA	John O'Brien, GCRG
Brenda Drye, So. Paiute Consortium	Don Ostler, UCRC
Lloyd Greiner, UAMPS	Bill Persons, AGFD
Jay Groseclose, NM Interstate Stream Comm.	Mark Steffen, Federation of Fly Fishers
Norm Henderson, NPS	Larry Stevens, Grand Canyon Wildlands Council
Rick Johnson, Grand Canyon Trust	Bill Werner, ADWR
Robert King, UDWR	Michael Yeatts, The Hopi Tribe

Committee Members Absent:

Christopher Harris, CR/CA	D. Randolph Seaholm, CWCB
Amy Heuslein, BIA	John Shields, WY State Engr. Office

Alternates Present:	**For**:
Garry Cantley	Amy Heuslein, BIA
Don Ostler	John Shields, State Engineers Ofc./WY

Interested Persons:

Matthew Andersen, USGS/GCMRC	Lisa Leap, NPS/GRCA
Craig Anderson, USGS/GCMRC	Paul Li, Bob Lynch's Office
Mary Barger, WAPA	Ted Melis, USGS/GCMRC
Gary Burton, WAPA	Barbara Ralston, USGS/GCMRC
Wayne Cook, Dept. of Energy	Scott Rogers, AGFD
Helen Fairley, USGS/GCMRC	Tom Ryan, USBR
Dave & Pam Garrett, M3Research	David Siebert, University of Arizona
John Hamill, USGS/GCMRC	LeAnn Skrzynski, So. Paiute Consortium
J.D. Kite, USGS/GCMRC	Dave Topping, USGS
Josh Korman, Ecometric	John Weisheit, Living Rivers
Loretta Jackson-Kelly, Hualapai Tribe	Scott Wright, USGS/GCMRC (via phone)
Ted Kennedy, USGS/GCMRC	

Recorder: Linda Whetton, USBR

- -

<u>Welcome and Administrative Items</u>: The chairman welcomed the members, alternates, and interested persons. A quorum (16 members) was established and attendance sheets distributed.

<u>Approval of the May 24-25, 2006 Meeting Minutes</u>. Pending two minor edits, the minutes were approved.

Review of Action Items (***Attachment 1***). Regarding the HBC genetics work, Matthew Andersen reported the humpback chub in the Grand Canyon are very closely related to each other no matter where the sampling location. They have varying numbers of specimens from each of the locations. Some were statistically significant while some were quite small but all of them seemed to be closely related to each other. Of most interest was that all of the *Gila* species that they looked at (humpback, roundtail, and bonytail) share genomic elements. They seemed to have cross-spread over historic geologic time quite a bit and one can find elements of each of those species in the other species.

OLD / NEW Business.

CRAHG Comments on FY07 Budget. Mary Barger reported the CRAHG was tasked by the SPG to provide input on the FY07 budget. There were very few comments on Reclamation's portion of the budget but quite a lot of questions on GCMRC's budget. As a result, they held a second meeting to focus primarily on GCMRC's budget and the long-term monitoring proposals. They didn't get to GCMRC's budget items except for the site assessment piece for long-term monitoring which still needs some work on recommendations.

TWG Comments/Responses to GCMRC Process. Mary Barger said the CRAHG feels there should be some standardized protocol for how TWG provides comments to GCMRC and then how GCMRC responds to those comments. Lisa Leap mentioned how NPS handled comments for the Colorado River Management Plan and offered to provide an Excel spreadsheet to GCMRC in hopes of generating some ideas for them. Kurt said it would be important for the TWG to see how their comments were incorporated or not incorporated and the reasons for not incorporating them.

The members offered the following suggestions: 1) Create one format for TWG to use and provide a space for GCMRC to provide responses, 2) Encourage members to not focus on editorial comments, 3) Determine which items have conflicts and organize, and 4) Policy conflicts should be forwarded to the AMWG for resolution. John Hamill said GCMRC received 500+ comments on the MRP. While he wants to be receptive to the TWG and their need to provide comments and receive responses, his staff is already stressed in producing documents.

► **ACTION ITEM**: Mary Barger and Lisa Leap will work with GCMRC staff in developing a comments and response document to address TWG concerns on GCMRC products (budget and work plan, research plans, etc.) by the next TWG meeting.

5-year Review of the AMWG Strategic Plan. Kurt said it's been five years since the AMWG produced the Strategic Plan and he thought it might be worthwhile to make a recommendation to AMWG to have that document reviewed, particularly with regard to information and knowledge that has been learned over the past five years and whether the program is closer to putting specific targets on certain resource management objectives. He asked for comments.

- *One of the things that GRCA brought up a few months ago was a first shot at some targets and desired future conditions from a land management standpoint. I would like to see AMWG take that up as an action item or whether they would like to develop entirely new desired future conditions or targets and/or what the basis of what we've provided initially as a starting point if nothing else. It's important not only for us as a land manager to determine what success is for our resources in Grand Canyon but also for GCMRC to have some targets and thresholds they can use in their science planning methods. (McMullen)*
- *That should be a policy discussion at the AMWG level and revision of that plan should be their job. (Stevens)*
- *It's really the program's strategic plan and the TWG then has a role and perhaps the question to the AMWG would be "what role do you want us to play if you decide that it's time to review the strategic plan and then maybe Ken's questions would come up?" DOI is producing a guide book on use of adaptive management and one of the chapters is measurements of success. (Kubly)*
- *The science advisors would fully support Ken's position on desired future conditions. They view the issue where the TWG would have the responsibility for making recommendations but the policy decisions would reside with the AMWG. GCMRC has recommended a five-year turnover in review especially of strategies and it's possible that*

maybe the AMWG could have the Strategic Plan looked at parallel with the activities for planning in the Center. (Garrett)

- *I think we really need it. It's hard to define a science program when the goals aren't clearly defined. You're dealing with things right now, for example building the TCD that may increase the size of the population of humpback chub and we still don't have official targets for HBC established. We don't have clear, quantifiable end goals that we're trying to achieve. We don't know what constitutes success. (Hamill)*

Kurt will bring the matter up at the next AMWG meeting as part of the TWG Chair report and strongly urge them to consider reviewing the Strategic Plan, particularly the desired resource conditions and what the targets are.

► **ACTION ITEM**: The TWG Chair will provide the TWG's concerns for updating the AMP Strategic Plan to the AMWG at their next meeting

TWG Chair Nomination Time. The current term for the TWG Chair ends Sept. 30. As such, Kurt asked the TWG to consider who they might want to nominate to serve for FY07. The voting will occur at the next TWG meeting.

New Business: Magril Analysis. Larry Stevens asked Ted Melis to talk about the Magril analysis and why it's important.

Ted said in 2001 GCMRC started funding some research and development work for monitoring protocols. The award was made to Bob Webb who hired Chris Magril, a graduate student/USGS employee. The proposal originally funded the work through 2005 but because of humpback chub initiatives and other program changes, the project was only funded for three years. In working to complete this effort and his related dissertation at the University of Arizona, Chris took it upon himself to develop cross sections for the entire Colorado River system below the Dam down to at least Diamond Creek. He utilized the modeling capability through an Army Corps of Engineers package called HECRAS. The procedure he used to develop the new cross sections was never documented in any USGS report. GCMRC is using the HECRAS with new cross sections; however, there is no peer-reviewed report which says what research was done to develop the new cross sections. Ted said it has really advanced capability and their GIS department is currently using it. It's also been verified through some efforts by Dave Topping to be quite accurate but there is no way to estimate new stages and the work can't be cited. Bob is committed to finishing up what he can but without continued funding, certain things will come to a standstill. Chris will be finishing his dissertation work in the next several months but needs approximately $30,000 to cover salary costs for 6-8 months and to get the report funded and published. Chris will continue to work on the report as long as he is employed by USGS and wants to complete his dissertation by October but is also looking for another job. Ted is concerned that Chris will be hired once he graduates and won't be able to complete the work. He said the real issue is documentation. GCMRC provided some additional salary tied to the reporting effort along with some additional CPI funding. The decision of the TWG at that time was that it wasn't appropriate to fund. Dennis said that when they get into the budget discussions, he wanted Ted to explain why the work didn't rank high enough.

Ken would like to know more about the deliverable aspects of the contracts and whether extra money is being spent on work that has already been contracted for.

Secretary's Designee Memo. Dave Garrett distributed copies of the memo from Mark Limbaugh to the AMWG dated June 16, 2006 (***Attachment 2***). He wanted to elevate a couple of issues, the first being a desire on the part of the Secretary to have more involvement in Colorado River issues, and the second is that the AMWG will function in a policy role and less of a technical, discovery role. Consequently, the TWG would play a more expanded role in assessments. He wondered how the TWG would perform as it responds now to a group that only needs to make decisions on information sets and recommendations rather than deal with any sort of in-depth discussions or evaluations. As such, he asked if the TWG was structured the way it needs to be to do that work and, if not, what changes would need to be made.

After a brief discussion, it was suggested the Roles Ad Hoc Group Report would be the mechanism to document changes to the functions of the AMWG and TWG. The TWG also felt it would be important to review the status of the AMP Strategic Plan because it's been five years since the document was drafted. Kurt said he would follow up on the status of the Roles AHG Report and ask the AMWG about updating the AMP Strategic Plan.

► **ACTION ITEM**: The TWG Chair will follow up on the status of the Roles AHG Report.

► **ACTION ITEM**: The TWG Chair will provide the TWG's concerns for updating the AMP Strategic Plan to the AMWG at their next meeting.

Organic Drift Studies. Ted Kennedy said he would present some results associated with the experimental flows that occurred last September and October. His work was done at Lees Ferry looking at how the different flow treatments affected rates of organic drift. He gave a PowerPoint presentation (***Attachment 3***).

***Q**: How does the machine know if it is organic matter or sediment? (Johnson)*
***A**: It doesn't. We have to figure that out. It's possible that we may never be able to move this downstream because the concentrations of sediment downstream are often much greater than organic matter. The only reason we're able to use it at Lees Ferry is because there isn't much sediment there. (Kennedy)*
***Q**: Are diatoms there to make confusion with the ash? (O'Brien)*
***A**: That's another issue that we need to think about because something that is living biological can often have a lot of inorganic material on it so a diatom has this silica shell and that whole thing is going to scatter sound much differently than something like a piece of filament as algae. One thing we might try this coming year is actually not just quantifying how much organic vs. inorganic there is but how much sediment vs. inorganics that are bound up to living things like diatoms so separate the two and see if we can get a better relationship. (Kennedy)*
***Q**: Do you think your results would've been different had the periods of time of stable and fluctuating flows been longer or shorter? (Johnson)*
***A**: We looked at the beginning and the end of each flow treatment. They weren't that different in terms of the concentrations that we saw with the start of the other treatment relative to the end. (Kennedy)*
***Q**: You started out this presentation by saying that both rainbow trout and humpback chub are drift feeders. Do you know if that's true of the smaller fish that are in the nearshore habitats? Do you know what the food sources are for the earlier life stages of humpback chub and how they feed? (Kubly)*
***A**: I don't know for sure. (Kennedy)*
***R**: They probably tend to feed more on either locally produced items or smaller food items, more plankton. (Persons)*
***Q**: You didn't show any invertebrate data. Was particulate organic matter combined? Did you separate out the invertebrate data? (Persons)*
***A**: Yes, we did. I can almost certainly say that the numbers of Gammarus we got are way too low to be able to make any statements about how invertebrate Gammarus drift was affected by these flows. It looks like we caught enough chironomids in each net to say something about that but I haven't had a chance to do that yet. We did separate the samples. We counted invertebrates on every one of the 1 mm samples and then counted invertebrates and weighed them on a subset of the finer mesh ones so that data is available. I just haven't had a chance to do that. (Kennedy)*
***Q**: Did you collect any New Zealand mudsnails? (Steffen)*
***A**: We definitely saw those in our net and will include that information in the report. Kennedy)*

Ted said there will be a final report available at the end of the fiscal year.

Nearshore Water Temperature Measurements and Monitoring. Craig Anderson gave a PPT (***Attachment 4***). He provided the following preliminary findings:

- Backwater temperatures on average 2-4°C warmer than associated eddies
- Similar temperature gradients at 6-9 kcfs fluctuations and steady 8 kcfs flows (slightly greater at 6-9 kcfs)
- However, individual backwaters exhibit different temperature trends as a function of geometry, isolation from the mainstem, and local isolation regimes

***Q**: Why did you choose to use driftwood for a float? (Lehr)*
***A**: I actually didn't conduct the study. I just selected to review it. There are visibility issues. The idea was to use the driftwood as the buoy. In the future we're going to try and camouflage buoys with driftwood. (Anderson)*
***Q**: You said the results were surprising so what were you expecting? (Barger)*
***A**: In other studies steady flows typically provide warmer temperatures because there's less exchange with the mainstem so the water has more residence time and so they have more time to equilibrate with the atmosphere. The fluctuating flows, even though there are low fluctuating conditions, tend to give more exchange with the mainstem which in turn doesn't allow the water to warm backwater habitats. (Andersen)*
***Q**: Is there some advantage to synthesize information already available rather than continuing to collect more data? (Johnson)*
***A**: I believe Larry Stevens is compiling a water temperature database with a comprehensive list of all the temperature studies that have ever been done. (Anderson)*
***C**: I should have a draft report by next Monday. (Stevens)*
***Q**: Why the concentrations of sites at River Mile 30 and 68? (McMullen)*
***A**: That's the region where the humpback chub are primarily found. That's one of the applications of having a good understanding of water temperatures and how that affects their growth. (Anderson)*
***Q**: So that holds true for the ones downstream as well? (McMullen)*
***A**: To my knowledge, no.*
***R**: There are regions throughout the system but by far the vast majority are closest to the LCR. (Andersen)*
***Q**: Are you going to try to make an assessment as to what the temperatures mean relative to the fish we're talking about? (Davis)*
***A**: My contract is only for the area around the Little Colorado River.*
***C**: If all these studies we've been doing don't show an apparent clear relationship, maybe a clear relationship doesn't exist that is significant to the fish. That needs to be done. (Davis)*
***R**: Numerous studies have been done. In the 1990s fewer than half of the backwaters were warm even in the middle of July so site selection means everything in terms of what results you get. There are a million reasons why site selection is important but the data has not been consolidated. (Stevens)*
***C**: So you could probably make some statements about a specific backwater but you can't make general statements about backwaters down the canyon? (Davis)*
***R**: Within reaches you probably could if you actually sampled within reaches. There are many reasons why the site selection criteria are important to consider (Stevens)*

Nearshore Biological Sampling. Barbara Ralston said the nearshore biological sampling work was done last fall during the fall experimental flows. Data was collected by Matt Lauretta, and SWCA and the report will be submitted by the end of the month to the Bureau of Reclamation as part of their requirements for the work. She gave a PPT presentation on: "Nearshore Biological Sampling During Fluctuating and Steady Releases in September and October 2005" (***Attachment 5***).

***Q**: How did you select your sampling locations? (Henderson)*
***A**: The sampling locations were randomly selected within the geomorphic reaches. They were basically one per geomorphic reach and they had 25 backwaters to choose from out of the whole river system. (Ralston)*
***Q**: So there were no criteria on any of the backwaters? It didn't depend on size or configuration?(Henderson)*
***A**: I wasn't down on the river. The average backwater size was about 400 square meters. (Ralston)*
***Q**: Does this work link to the foodbase and the water temperature issue? (McMullen)*
***A**: The second trip was associated with the seining trip that was already scheduled during that period. They were collecting that data anyway and so that was part of the reason the dates for the second trip were already set. The seining data has been collected since about 2003 in the backwaters so we have a fairly consistent record for backwater seining but the shoreline sampling hasn't been as consistently done. (Ralston)*

Recent findings related to YOY trout survival in the Glen Canyon Reach. Josh Korman said the work initially began in 2003 with the objective to look at the effects of higher winter fluctuations, experimental 5-20K fluctuations, and the effects on juvenile life stages under the rationale that the adult population size is very likely controlled by the survival of fish either at the larval or early juvenile stages. He distributed copies of his PowerPoint presentation (***Attachment 6***) and said it would address how past information is being included in the integrated stock assessment.

***Q**: When you talk about understanding Lees Ferry trout population, shouldn't we try to understand what's going on in the population downstream? Is there an assumption that when you have high numbers, the fish are going to transfer down there? I would argue you have a whole different thing going on down at the LCR and you need to understand how the HBC might be affected. (Henderson)*
***A**: That's a whole other area that you're looking at through the density of Lees Ferry to determine the number of fish you're seeing downstream. We need to establish that linkage. (Korman)*
***Q**: You might be able to make some controlled population in Lees Ferry, the trout population at Lees Ferry by dam operations, but does that mean you're controlling the population of the LCR the same way? Are they spawning differently up in the side streams or wherever so it doesn't really affect them? (Henderson)*
***A**: So this question initially is focused just on Lees Ferry. If you want to ask that question, that means working down there to some extent. It's a cost thing and so we focused our efforts there. I think it's worth understanding what's happening in Lees Ferry because that's a pretty cool resource and people depend on it. It's also a great place to pilot your work as other researchers have found in the past. Any supply that is happening in the mainstem is happening below 8,000 cfs. There's not a lot of spawning above 8,000 kcfs in the mainstem below Lees Ferry. (Korman)*
***Q**: Have you tried to integrate any aquatic foodbase into your project here? I'm asking because some of the stuff that has come up lately showed almost no drift during the month of October. Do you think that could've affected the spawning in 2006? Is it possible that the foodbase this spring was in better condition than it was in the spring of 2004? (Steffen)*
***A**: The thinking is that yes, it is and so part of the really good survival and growth rates will probably be measured this year. Well, three things happened: (1) probably had better incubation, survival of the YOY, (2) lower densities, and (3) had the Cladophora up there. To interpret the 2006 data at the moment, the foodbase will just be another confounding factor. (Korman)*

Water Temperature Modeling Update. Scott Wright (via telephone) said the temperature data being gathered on the mainstem is in a draft report and being reviewed. He proceeded with a PPT presentation (***Attachment 7***).

***Q**: You talk about this 3-D model and from the presentation made this morning, it seems like the response of the backwaters and nearshore was very site specific. Do you have some ideas about how you're going to generalize that? (Johnson)*
***A**: If it does turn out that it really is site specific, we might have to come up with two or three different types of backwaters depending on their orientation. If we can figure out why certain backwaters respond differently than others, that's the first step and then we can start to group them and come up with some method to figure out their relationships. Hopefully we won't have to model every single backwater differently but I think we still need to do some data collection, review the data, and then try to figure out if there is a way to generalize them in groups. (Wright)*
***Q**: Did you say Amy Cutler's model was specific to a specific spot or was there some generalization that occurred there? (Johnson)*
***A**: From what I have read, it was site specific to the two or three sites where Josh and Matt collected data in 2004. Craig has looked at that more than I have so he could correct me on that. It could be applied to other places. (Wright)*
(Clarification from Amy Cutler: The GEMSS model can be applied to any river reach for both 1-dimensional and 3-dimensional modeling as long as there are bathymetric data for the reach.)

Sand Transport during steady and low fluctuating flows in September/October 2005. Scott Wright provided the sand transport results during the steady vs. low fluctuating flows from last year with a PowerPoint presentation (***Attachment 8***).

Discussion of FY 2007 Hydrograph. John Hamill passed out copies of an outline (***Attachment 9***). He said the SPG developed three potential options:

1. ROD Flows (MLFF)
2. Steady late summer flow (Sept would be 6-9K, Oct steady 8K, otherwise ROD)
   2(a) Same as Option 2, but with winter fluctuations (Winter fluctuations would be 5-20K Monday through Saturday, December through February, steady 8K on Sunday, and ramping rates of 5000 cfs up and 4000 cfs down). Purpose is not to suppress trout - though there might be some impacts, but to mitigate effects to power.

He said the SPG talked about the above three options and it was clear that it wasn't likely the group was going to reach a consensus so they held a vote. He presented those results:

SPG developed three potential options: (w/o BHBF, as per TWG motion)

1) **ROD flows (MLFF)**

First SPG Vote: Option 1 vs Option 2

- 6 SPG members vote for Option 1
- 6 SPG members vote for Option 2

Note: Option 2(a) was not included since option 2(a) is based on there being initial support for fall steady flows.

Second SPG vote. If TWG decides in favor of Option 2 should we do them with or without winter fluctuations (Option 2(a))?

- 7 SPG members are in favor of option 2(a)
- 3 SPG members are opposed.

Third SPG Vote: March BHBF with no additional costs for studying effects beyond normal monitoring

- 3 SPG members vote in favor
- 7 SPG members are opposed

He said Rick Johnson made some proposals to the SPG and asked him to make that presentation. Rick said he wasn't present during the SPG's discussion but said Grand Canyon Trust had sent a letter (***Attachment 10***) in response to Mark Limbaugh's memo addressing two of their concerns, (1) the one related to the above discussion and (2) the WY07 hydrograph. The GCT feels experimental flows should be done that perform on the intent of the Grand Canyon Protection Act. They don't think MLFF is the way to go and are not in favor of having another interim year. They also feel something needs to be done that performs on the Reasonable and Prudent Alternative. They're asking for equalized volume flows all through July and then starting in August going to steady flows and doing SASF flows in WY08.

Dave Garrett said the SPG recognized in working toward the planning, they are finding the issue is coming down to fluctuating vs. a steady flow or at least some combination of those.

Kurt said he would take some clarifying questions in discussing the FY07 hydrograph but cautioned the TWG that they needed to understand the FY07 workplan and budget as well.

Discussion:

- *In Ted Kennedy's presentation it showed very little drifting food with the steady flows in October. We didn't know that at the SPG meeting when somebody proposed those steady flows for the whole month of October. Now Ted's report shows no drift with steady flows in October so I think we should consider that if we're going to implement. (Steffen)*
- *As a scientist participating in this program it's always very frustrating because I look for a set of hypotheses to be tested by flows. The way we approach this is always through what we guess as to be kind of a designer flow of preference and what I would really like to see are good, clear hypotheses to be tested by specific flow experiments so that we understand our progress rather than just shooting in the dark. Two questions that arise today: (1) Two weeks of steady flows doesn't do it. We can't see a biological impact. Yes, good modeling of the sediment transport during that time but that's not enough time to see a biological impact. How long does a steady flow have to be to be able to see change in a desired resource condition, and does the time of year matter? We're just seeing steady flow data from Sept and Oct. That may be too late in the growing season for steady flows to do much good to the target resources - small fish mostly. If we get into steady flows in August, that's a huge hit on the economics but there are still key questions to answer. Is this tradeoff worth facing? It would be scientifically appropriate to see a set of hypotheses with which we approach these flow experiments. (Stevens)*
- *(1) Josh did recommend we run ROD flows for a year for the YOY steady which isn't funded in FY07, and (2) with regard to the GCT letter, just a comment on process. The roles and responsibilities report isn't out but it doesn't*

seem that sending a letter to the Secretary follows the process the adaptive management program is set up under. (Barger)

- *Is GCMRC going to bring a short synopsis of the resource implications of the different options for WY07? If we're going to make a recommendation to AMWG, it seems we should have some analysis of what the resource implications of the flows are. (Johnson)*
- *For the long-term experiment we're running economics on all the different proposals and technically two of these are being run (proposed ROD flow and GCT) so you would have the economic analysis. (Barger)*
- *The AMWG call is scheduled for Sept. 6. I don't think we would have a product ready for their review in time. We wouldn't have something that has been peer reviewed. (Hamill)*
- *Heather (WAPA) is working on the analysis and could have in a few days but it probably won't be peer reviewed before it is released. (Wayne Cook)*

Public Comments. None

GCMRC Announcement. John announced that Ted Melis is the new deputy chief of the GCMRC.

Monitoring and Research Plan Overview. John Hamill said the SPG reviewed the MRP extensively in June and will go through another iteration based on SPG comments. He's not seeking approval of the MRP today but rather setting the stage for the work plan. He passed out copies of the MRP (***Attachment 11a***) and gave a PPT presentation (***Attachment 11b).***

BAHG/SPG Update: Dave Garrett provided copies of the "SPG Progress Report on Cooperative Science Planning Activities with the Grand Canyon Monitoring and Research Center" (***Attachment 11c***). He said there were several issues the SPG couldn't completely resolve and wanted to bring those to the TWG. He stressed that he was only going to speak on the Annual Work Plan and about the programs and projects that did not get totally resolved, meaning they didn't know how GCMRC was going to allocate funding to those. John said there were a lot of comments the SPG provided on the workplan, things about inconsistencies between questions that were in the annual workplan and minor issues. It's GCMRC's intent to revise the workplan based on comments from the SPG meeting along with comments from today's discussion. He reviewed those goals where there wasn't complete resolution by the SPG.

- AMP Goal 1. The Submerged Aquatic Vegetation Project: GMCRC has determined the project is best conducted over two years, not one year as proposed in the draft AWP. This reduces the anticipated costs to ~$48K in FY07.

- AWP Goal 2. The SPG proposed that the HBCAHG identify the questions that need answering related to fate of YOY HBC and define a scope of work for GMCRC to implement in FY08. GCMRC agreed to start working on researching available technologies for marking/tracking YOY starting in FY07.

Chute Falls Translocation. Additional translocations will be considered after the PEP is concluded. Dennis said it was his understanding that the PEP is not to address the Chute Falls assemblage; it's on the sampling of HBC and trout population in general. Matt said there is a Chute Falls project in the budget as proposed and that an additional $15K was needed. Glen said they also recommended the Chute Falls monitoring work be folded into the whole LCR monitoring effort. Bill asked who makes the decision on doing translocation work in FY07 because there appears to be a disconnect between when the PEP is held and the work is done. Glen said the information could be brought to the TWG with a recommendation for FY07.

Mechanical Removal. Dave said the SPG recommends that the non-native fish mechanical removal program focused primarily on trout be discontinued in 2007 in an effort to be redirected at other non-native species provided that appropriate monitoring of native and non-native fish populations are conducted. He said one of the things they didn't do in the SPG was, in fact, if the TWG decided that non-native fish mechanical removal had to be reinitiated when it is out of the budget now, where would the money come from. The SPG dealt with that issue. He said this is a program currently being evaluated on the other non-

natives for issues which might pose a need in that arena for mechanical control. He said the ongoing monitoring efforts should include that work. Ken said that the GRCA doesn't have the funding to do the work so they're looking to the AMP to continue funding that work. Bill Persons said he thought the AMP might want to consider other options. Dennis said there is nothing in the Strategic Plan or anywhere else that mentions the "transition" funding for a project. He said that one of the things that still is left out is what are the targets that are going to be used to make the determination and feels that this needs to get on the table for FY07. Dennis said it would be advisable to put this on as a FY07 question about whether there needs to be a project to help determine when the decision would be made to make mechanical removal a management action. John O'Brien said this discussion was held before to the extent that if a goal of mechanical removal is to remove trout, then it can be considered a management action because they know now that trout can be removed but if the goal is to improve habitat for humpback chub, then this is still part of an ongoing experiment. He went on to say the original idea was to remove trout for two years and then not remove trout for two years and analyze the difference. Dennis said there is a pressing FY07 question about a target for any resumption of mechanical removal and the TWG isn't making any recommendations to the AMWG on what that target is. Matt said it was their intent that the non-native biologist would develop something to address those questions. Matt reaffirmed that the money is in the FY07 budget for that purpose. Loretta Jackson reminded the TWG that any mechanical removal is to have close consultation with the tribes regardless of whether it's another non-native species or the same.

- AWP Goal 4. Rainbow Trout. Status: $20,000 added to budget to support a PEP in FY07.

- Goal 6. A field sampling project should be put on hold until after the PEP in spring FY07. The NPS has interest in having input to the vegetation mapping/monitoring program. GCMRC and Larry Stevens met and worked out the details. Matt said that information would be presented at tomorrow's meeting.

- Goal 7. The SPG agreed that there needs to be funding to continue operation of the LCR Gage. GCMRC will provide information at tomorrow's meeting as to where the money will come from in the FY07 budget.

- Goal 11. Dave said there was a request that $125K be provided for an experimental fund. The SPG recommends funding up to $25K per tribe be made available in FY07 from the experimental fund and/or from the budget currently allocated for the SAV project if the SAV project doesn't get approved for FY07 and/or the economics project that was scheduled for FY07. Dennis said all the contracts have deliverables. If this is done, he said it makes sense to hold the funds above the line in the Basin fund and not suffer the burden until they're needed.

- Continuation of SPG. The SPG was formed to do one task which was to work with GCMRC and AMP collective body and was given 11 months to put all the planning direction together including the new experimental options and assessments and then it was to close by the end of September. The SPG discovered there were many process issues and needs of the AMP that had not been dealt with. As such, the SPG is going to write a report on what it did and didn't do and state that the things they didn't do are affecting everything in the program. They will also include recommendation that a group, perhaps the TWG, address those outstanding issues.

- NPS Extra Permitting Costs. Dave reported that $7K was added into the FY07 budget to cover NPS costs in Reclamation's portion of the budget to avoid the burden rate charged by GCMRC.

- CRAHG. The SPG asked the CRAHG to provide input to them on the proposed GCMRC direction in research. The CRAHG met and came back with a proposal prepared by Mike Yeatts. The SPG reviewed the proposal and wanted two changes made. The changes were made and brought back to the SPG. The proposal generated further discussion which carried on until this past Monday. The SPG was not able to go back and get that proposal revetted for their final conclusions. Consequently, this is one area in which the whole SPG could not convene to provide a clear recommendation. Dave said there are

recommendations from the CRAHG and he has commented on those. He said there are others who would like to comment on the document:

***C**: Want an addition: "GCMRC will use data collected by NPS" means that NPS will be using the NPS monitoring legacy data. (McMullen)*
***C**: I think the proposal and the CRAHG probably agreed on the fundamental part that the proposal is to go back, continue with the assessment of sites but limiting the number of sites from what was originally proposed two years ago, basing it on some of the information that has come in from last year's site assessment. The second part was to develop the long-term monitoring program. During the SPG conference call, there was a desire to see some language put into the development of a long-term monitoring proposal which I did and I think the CRAHG got ahead of ourselves in actually reviewing the proposal for the FY07 work as being the initial step of a long-term monitoring proposal but really it was just to direct GCMRC to start to develop that cultural long-term monitoring proposal in conjunction with CRAHG, TWG, AMWG, PA Group so I think some of the language recommendations that were in there, we were getting into wordsmithing but probably all the CRAHG members agreed that GCMRC should start to develop that long-term monitoring proposal. I guess if we look at it at that level, we can probably get to an agreement pretty quick. I got the impression that it wasn't the development of the long-term monitoring proposal that was being debated, it was the specifics in how that long term monitoring would look. My intent in putting that together was these were some things I thought we had to deal with, some topics that needed to be dealt with when that long-term monitoring proposal was put together. It didn't need to be debated in the work plan for next year. (Mike Yeatts)*

Mary said that she would try to hold a CRAHG meeting tonight and provide comments tomorrow. She reminded the TWG that the CRAHG only addressed the site assessment portion of the entire budget and wondered if the TWG wanted them to look at the pieces of the cultural budget as well. Helen said the cultural budget was discussed but the site assessment phase of it was of most concern. Kurt said he would like the CRAHG to provide a recommendation on the site assessment so they can close the discussion.

Update: Mary provided a revised version of the FY07 Archeological Site Assessment Plan (***Attachment 11d***) on August 8.

Expectations for the FY07 Budget and Workplan Discussion

John said the spreadsheet was revised to reflect the funding changes that Dave presented earlier but the workplan remains unchanged. He said GCMRC's commitment is to modify the plan in accordance with agreements reached in today's meeting and include other less substantive comments about inconsistencies between the way science questions or CMINs were worded, etc. There is a whole block of those that need to be addressed and GCMRC will go back and make those changes along with any changes from the TWG and then they will produce a new version that will go to the AMWG.

Kurt asked the members to identify the projects they have concerns about so they can be addressed at tomorrow's meeting and forego a complete presentation on the work plan.

Norm said he was concerned about the process because it was his understanding that the SPG reviewed the workplan and made substantive comments. The workplan was supposed to be revised and then the revised workplan was to be presented to the TWG for their review and approval at today's meeting. Without those comments or revisions, he doesn't feel the TWG can properly address the workplan.

John explained to Norm that the SPG had 30 pages of meeting notes, not 30 pages of changes. GCMRC extracted what they felt were of most importance to the TWG and will go back and address the other issues to the best of their abilities. John said he didn't think the changes would change the direction of the budget or anything else but would ensure the language in the MRP and the AWP support each other. GCMRC will check for inconsistencies between the two documents and make the necessary corrections. Given that the SPG met at the end of the first week (July 7) and he had two employees who were on vacation, John said he didn't have time to do a major rewrite of the workplan.

Norm said that was his understanding on the process and the whole reason for postponing the meeting until today was to provide additional time for GCMRC to make the changes and get the revised document back out to the TWG. John said there was no explicit direction to GCMRC coming from the SPG meeting and he never agreed to make the changes. He deferred to the TWG Chair as to whether or not he feels he can take action on the plan.

Kurt said he wanted the TWG to consider Norm's comments and John's response to those comments but that he would still like the TWG to identify any concerns to him so they could be specifically addressed at tomorrow's meeting.

Dennis asked if Josh or GCMRC had such a project in the FY07 budget (concerning rainbow trout early life stage survivorship) and whether Josh would be willing to bring something for the TWG's consideration tomorrow. John said there is nothing in the FY07 workplan that addresses the continuation of Josh's work. While there has been a lot of discussion between Josh and Matthew about continuing that work, he felt it would be difficult between now and tomorrow morning to come up with a good workplan. He suggested two options: (1) the TWG could decide to fund the work out of the Experimental Flow Fund because it is somewhat of an experimental project, or (2) a new workplan would need to be developed to include this project.

Other projects of concern:

1. Submerged Aquatic Vegetation (SAV)
2. Synthesize water temperature data, synthesize water quality data for Lake Powell, and the one we discussed today.
3. Josh Korman's redds survey work

Kurt reminded the TWG that the ultimate goal of the meeting was to generate a recommendation to the AMWG for Sept. 6 conference call regarding the FY 2007 Annual Workplan and Budget and hydrograph.

Public Comments. None.

Adjourned: 5 p.m.

Glen Canyon Dam Technical Work Group Meeting
BIA Conference Room, Arizona Center Building
Phoenix, Arizona
August 2-3, 2006

Conducting: Kurt Dongoske, Chairperson **Convened:** 8:05 a.m.

Committee Members Present:

Mary Barger, WAPA
Steven Begay, Navajo Nation
Kerry Christensen, Hualapai Tribe
Jonathan Damp, Pueblo of Zuni
William Davis, CREDA
Brenda Drye, So. Paiute Consortium
Lloyd Greiner, UAMPS
Jay Groseclose, NM Interstate Stream Comm.
Norm Henderson, NPS
Robert King, UDWR
Dennis Kubly, USBR
Glen Knowles, USFWS
Phillip S. Lehr, Colo. River Comm./NV
Ken McMullen, NPS/GCNP
John O'Brien, GCRG
Don Ostler, UCRC
Bill Persons, AGFD
Mark Steffen, Federation of Fly Fishers
Larry Stevens, Grand Canyon Wildlands Council
Bill Werner, ADWR
Michael Yeatts, The Hopi Tribe

Committee Members Absent:

Christopher Harris, CR/CA
Amy Heuslein, BIA
Rick Johnson, Grand Canyon Trust
D. Randolph Seaholm, CWCB
John Shields, WY State Engr. Office

Alternates Present:	**For**:
Garry Cantley	Amy Heuslein, BIA
Don Ostler	John Shields, WY State Engr. Office

Interested Persons:

Matthew Andersen, USGS/GCMRC
Craig Anderson, USGS/GCMRC
Mary Barger, WAPA
Mike Berry, USBR
Gary Burton, WAPA
Wayne Cook, Dept. of Energy
Helen Fairley, USGS/GCMRC
Dave & Pam Garrett, M3Research
John Hamill, USGS/GCMRC
J.D. Kite, USGS/GCMRC
Josh Korman, Ecometric
Loretta Jackson-Kelly, Hualapai Tribe
Ted Kennedy, USGS/GCMRC
Lisa Leap, NPS/GRCA
Paul Li, Bob Lynch's Office
Ted Melis, USGS/GCMRC
Barbara Ralston, USGS/GCMRC
Scott Rogers, AGFD
Tom Ryan, USBR
David Siebert, University of Arizona
LeAnn Skrzynski, So. Paiute Consortium
Sam Spiller, USFWS
Pam Sponholtz, USFWS
Dave Topping, USGS
John Weisheit, Living Rivers
Scott Wright, USGS/GCMRC (via phone)

Recorder: Linda Whetton, USBR

- -

<u>Welcome and Administrative Items</u>: The chairman welcomed the members, alternates, and interested persons. A quorum (16 members) was established and attendance sheets distributed.

USGS Press Release. John Hamill passed out copies of a press release entitled, "Endangered Humpback Chub Population in Grand Canyon Stabilizing" along with a Fact Sheet (***Attachment 12***). Ken McMullen asked if the release had gone through the POAHG. John said he didn't know what the protocol was for releasing new information and sending through the POAHG.

Mapping the Submerged Aquatic Vegetation Mapping. Ted Kennedy distributed copies of the "Mapping Submerged Aquatic Vegetation in Glen Canyon Using Hydroacoustics - A Proof of Concept" PowerPoint presentation (***Attachment 13***). He provided the following schedule for the project deliverables:

- Seasonal base map (Spring 2007 & Winter 2008)
  - Draft of 1st map to be presented to the TWG by July 31, 2007
  - Completed 1st map to be delivered by December 31, 2007
  - Completed 2nd map to be delivered by September 30, 2008
- Report describing methods, results of invertebrate and diatom research and relationship of SAV to fish distribution - to be delivered by September 30, 2008
- GIS coverage of trout distribution/density - to be delivered by September 30, 2008

***Q**: Have you considered doing this in a section of the river right around the LCR, above and below the LCR, to compare the differences in habitat, and how it's influenced by the turbidity from the LCR? (Steffen)*
***A**: I've thought about taking this downstream in a general sense and focus on areas that support populations of fish that we're really interested in. It's important to focus on Glen Canyon as a proof of concept. It gets a lot more expensive when you start taking this stuff downstream. (Kennedy)*
***Q**: You mentioned work that has been done by AGFD in Glen Canyon, do we have any of this same type of work on the habitat of the chubs above and below the LCR to use as a base to compare? (Steffen)*
***A**: I don't know. I think we may have classification data, cobble, boulder, sand, that sort of thing but I'm not sure there is anything out there on vegetation or aquatic vegetation throughout the channel. There's obviously shoreline stuff but nothing that is throughout the whole river. (Kennedy)*
***Q**: How was the compositional change documented in the 1990s? (Davis)*
***A**: It was mostly observational and was quantitative to some extent too but people working up there, collecting samples of materials from the bed but again this was all nearshore stuff and basically the only thing that they saw prior to the 90s was Cladophora algae. With the onset of the interim flows, they started seeing these new players showing up. Again, they were mostly on the sandy substrates that were probably moving a great deal with the higher fluctuations that were happening in the 80s and then with the stabilization of flows starting in 90s, those substrates weren't moving around as much and so these things were able to colonize there. (Kennedy)*
***Q**: There were no studies done? (Davis)*
***A**: I think you could definitely say that these things weren't there prior to the 90s or they weren't there in much abundance. (Kennedy)*
***Q**: In this study are you going to be employing any of the methods that were used in the 90s to document this change? (Davis)*
***A**: With the current foodbase project, we are collecting quantitative samples at ten different locations in Glen Canyon and assessing what's up there so in that sense we are replicating that. (Kennedy)*
***Q**: But your methods are different, though? (Davis)*
***A**: The methods that we're doing for the quantitative samples are actually very similar. We're sampling in a different habitat. The past work tended to be focused on cobblebars exclusively and we're sampling on cliff bases and sandy substrates in addition to cobblebars. The methods that were used by AGFD to do these surveys were, I believe, floated along the shoreline and continuously they would basically record whether they saw visually different types of SAV and write it down. They also did 1-3 scales of what they thought the density was. We could do that as well. (Kennedy)*
***Q**: I'm just wondering if there is a way to dip back into that old information in comparison to what you're going to develop now. It seems to me that you don't want to just throw out the data and say that the methods were no good. I would like to take this new method that you're proposing and be able to attach it to the old information as well so that we have a continuous dataset. (Davis)*
***A**: It's not at all continuous in terms of the surveys that AGFD were doing. I don't think they've done those since 2000 but that's a good point. We could basically follow the same methods that they did and that wouldn't be any trouble to do because we're going to be on the boat running these transects. (Kennedy)*
***C**: And there is a wealth of quantitative data that might help address some of these questions, both stuff we collected through the 90s and Joe Shannon has done a lot of work up there. Dr. Hall's work might help address that first*

question of trying to establish a relationship between density and species composition of invertebrates and diatoms among different submerged aquatic vegetation. Some of that work is already done and I suggest mining the data you've got. (Persons)
***R**: So we're looking at all different habitat types that are up in Glen Canyon. When I say habitat types, I mean physical habitat types - cliff faces, sandy substrates, and cobblebars. The effort that we're doing with those collections is comparable in terms of the monthly effort to what AGFD and Joe Shannon did. The goal of that project is more of a comparison of upstream and downstream and so how does algal density and production in Glen Canyon compare to what we see at different points downstream. If you really want to get a handle on how these five different SAV types that we see up there compare in terms of invertebrate and diatom density and also to get a real good handle on their distribution in Glen Canyon, we would need to scale up the effort and I suggest this is the way to do that. (Kennedy)*
***C**: It may just be a question about how important is this information and is this the time to go get it. It seems like some of this work is already being done under Dr. Hall's program. There is a quite a bit of data available that would answer some of the questions. (Persons)*
***Q**: How confident are you in your ability to detect changes with past data? Every report I've ever read said too variable, can't say anything about change over time. I wonder if part of that is because those efforts were focused on the shoreline which represents 5% of that habitat and I wonder if mapping the entire canyon will increase our power to detect change. (Kennedy)*
***Q**: Did you go through the discussion that the SPG had? Dave Garrett identified there was a split on this project. Did you cover the questions that were raised? The questions that you've identified, are they part of the critical science questions that came out of the knowledge assessment work? What I'm trying to get to here is how we arrive at our priorities for our dollars. (Kubly)*
***A**: One of the CMINS or RINS is - what is the current distribution and abundance of primary producers in Glen Canyon. The first goal of this project, mapping the submerged vegetation, would truly get at that question. It's up to you guys to decide if addressing the RIN is a priority. The reason I tacked on these other questions was mainly because we're going to be up there looking at this stuff and it seemed like it would just make sense while we're doing the mapping to try and get at these other things. The AGFD data or Korman's data will be collected and it wouldn't be a ton of work to develop coverage of that and then just intersect it with that. I think the first question, what is the distribution of primary producers in Glen Canyon, that's an important one and the other stuff is just kind of bonus that I feel we're capable of tacking on and that's it worth doing given the potential that these different SAV types may support very different densities of invertebrates and diatoms. (Kennedy)*
***C**: Dennis, you referred to Dave's questions presented yesterday. The primary question I believe that I see in these notes is regarding the budget. We haven't been able to stretch this schedule over a 2-year period which halves the work in FY07 and 08. We've proposed about $96K annual budget for those two years and now we're talking about one-half of that, $48K. (Andersen)*
***C**: What I was getting to Matt was that in the SPG, the question was: You have approximately $500K in your foodbase study. If this is important, why wasn't it acknowledged at that time and made part of the scoping process. These are somewhat habitat questions, but they're certainly foodbase related as well. (Kubly)*
***R**: And they also have a close relationship to the trout population and so in thinking about how we can address a range of the 12 goals, this is one that kind of straddles Goal 1 and Goal 4. Perhaps it was a mistake on our part to put it in goal 1 because people see it as a deficiency but I think it does address both information about the foodbase as well as addressing needs of the trout population. (Andersen)*
***Q**: Two issues: First is the review of the historical literature. We did quite a bit of dredging up in that reach so it's not all nearshore. If you read those papers, we pretty carefully stratified the depths at which we were sampling to better understand distribution back in the early 90s of the primary producers across the channel, so please don't misquote on that because those are pretty robust data. Many of the problems that were experienced by the people up there is a high variability and even with the going meter by meter across the shoreline, vegetation can often occur in patches that are small and when you do a version of a TIN model of the vegetation types that you encounter. If the patches are small, that means you get one point that is one thing and you get a bunch of others. You only have a point there. You don't really know what the actual location is. Hopefully your camera mapping will tell you something about the finer scale resolution. This seems like very important work but I'm quite concerned that you launch into this and get a bunch of data. The problems that have faced us in the past alter the aquatic work have been application of it to a long-term frame as Bill mentioned. Even though there are opinions about the relationship between foodbase and fish, as far as I know, we still don't have any solid indication of the strength of that linkage. Another outstanding issue is the taxonomy of the invertebrates. I don't know if you're going to do the taxonomy on the things you collect but there a whole bunch of groups that are very tough to work with - the flatworms, earthworms. There are invertebrates that we don't know very much about. The taxonomy is kind of challenging. One way to approach the prioritization process that Dennis is questioning is to give us an ecosystem diagram showing us where your study fits into the overall picture. (Stevens)*

R: This Biosonics unit is sending out sound pulses. It has a six degree cone and so at 10 meters, it's looking at a one meter swath essentially and so I would submit that it probably has the capability to detect patches and it's sampling like a thousand tons a second so it's going to be able to tell patches vs. lots of other things. (Kennedy)

Vegetation Monitoring Update. Barbara Ralston passed out copies of her PPT presentation (***Attachment 14***). One of the parts of the project was to integrate tribal monitoring. The results of the synthesis will be available by the end of this year. There will be a PEP panel convened later this year with the goal to talk about what's been happening since 2000, incorporate the tribal comments associated with this approach, and get recommendations on how to continue in this program. Depending on the PEP recommendations, they would release an RFP in FY07, identify a cooperator by June, and begin field work in September. She doesn't anticipate an integrated approach until FY08 after coordination on tribal monitoring has occurred.

***Q**: What's the rationale for conducting a PEP review in the middle of a monitoring program vs. before or after? (Christensen)*
***A**: The PEP review is not really going to be in the middle of a monitoring program. The intention was that the TEM project would last five years. We're at 06 which would have been the end of five years. Data associated with that project pretty much stopped being collected in 04. We're at a point in time where we can assess what was done and make a determination of how we want to proceed for the next five years. (Ralston)*
***Q**: I thought you were going to release an RFP prior to the PEP? (Christensen)*
A: No. The PEP would be in November and the RFP would be in the spring with the idea that recommendations would be available by January. (Ralston)
***Q**: What will be the overall sequencing of the core monitoring process in the MRP in relationship to the sequencing or timing of the PEP panel and a contract that is being let? (Henderson)*
***A**: I guess we anticipate that we want to have those in advance of the PEPs so would like to get interested parties from TWG, SPG, and other parties so we have some guidance going into the PEPs. (Andersen)*
***Q**: Do you have a time frame of when this review would happen? (Henderson)*
***A**: Within 30-60 days in advance of that PEP. It would be difficult to conduct a TWG and a PEP review at the same time so we need to be able to summarize what TWG management needs are. (Andersen)*
***Q**: You made a comment that terrestrial ecosystem monitoring was different from tribal monitoring. Can you elaborate? (Skyrnski)*
A: Again, one of the recommendations from the PEP was to include tribal perspectives in terrestrial monitoring which would be part of the terrestrial integration. Originally, the idea would be that tribes would provide input into the program or they would take the data that was presented and utilize it for their monitoring or provide some perspective based on that information. We provided funding to the participating tribes. I think by putting that off for a year we can start to incorporate the tribal monitoring aspects into that program so that it's more whole than separate. (Ralston)

Ancillary Projects by other Stakeholders. Dennis Kubly said he sent out a request for ancillary projects, those projects being done in the CRE or the geographic area around it that could either complement program projects or confound the science, i.e., activities that would conflict with other activities in the program. He asked those who responded to his request to provide additional details. Note: The list (***Attachment 15***) was updated following the meeting.

- Little Colorado River Multi-Species Update. Pam Sponholtz said she attended a mid-July meeting of Little Colorado Multi-Species Group and they are still working on the GIS aspects with the University of Arizona as well as Northern Arizona University.

- Regarding the Upper Colorado and San Juan RIPs, Dennis said that he recently saw that the Biology Committee intends to use the AMP's Genetics Management Plan in the upper basin as a more broad geographic application for humpback chub. Glen said he didn't know exactly how that was going to be done but knew of their support for developing a genetics management plan and a plan for developing stocks and fishes. He didn't think any samples were being provided to Connie Keeler Foster. If they do, he'll report back to the TWG. Dennis said he also heard there was some consideration for pulling HBC out of the Yampa Canyon. Bill Davis said there are number of small clusters of HBC throughout the basin and they don't seem to be doing very well. At the last Biology Committee meeting, the committee asked Tom Czapla to prepare a contingency plan for dealing with the issue of possibly pulling fish out of the river and putting into some refuge but there is still some reluctance to go into any captive breeding

population. Because populations are going down, they may gather some of the genetic diversity while it's still out there (YOY) and put them into some sort of refuge.

Lake Mead/Lake Powell Shortage Criteria. Don Ostler said the basin states and the DOI Secretary have been working on a shortage plan and a plan to coordinate operations with Lake Powell and Lake Mead. This has a potential of coming into play in WY07. The existing minimum release target is 8.23 maf/year or equalization if there is a lot of water. There are alternatives being evaluated by the Secretary under the current NEPA that would make that significantly different. Under some new alternatives, minimum annual releases could decrease to 7.48 maf annual release which would change the monthly volumes or if Lake Mead and Lake Powell hit certain low water triggers, it could result in balancing of contents under low conditions which theoretically would either be less than 7.48 maf or more than 7.48 maf and possibly more than 8.23 maf under low water conditions. There is a significant amount of uncertainty as to the operations of the reservoir as the program moves forward in the FY07 workplan. He wanted the TWG to be aware that it's there and watch the NEPA process and make sure that things are coordinated as they become more firm.

TCD-Related Projects. Dennis said there are approximately five projects funded with TCD dollars that align with work being done on a proposed TCD for Glen Canyon Dam, i.e., thermal modeling downstream, organic drift to look at the utility of acoustic sampling, etc.. Dennis said the Scope of Work is already in place for next year but as the budget is developed next fiscal year, all projects will be identified to the TWG as they are developed. Bill Persons expressed concern about projects being thrust upon the TWG with little or no review.

Life Cycle Impact Assessment Study. Gary Burton said WAPA is funding one project that should be completed this year. The study looks at hydropower as it relates to other power sources within the Western Electric Coordinating Council and uses Glen Canyon Dam as the hydropower example against geothermal biomass, natural gas, and coal oil. The underlying purpose is to look at the environmental impact footprint from cradle to grave of the different energy sources. The reason to look at that is so that when a tradeoff for hydropower is done, there is an understanding of what environmental impacts are being traded off for. There is an ASTM standard being developed for environmentally preferable power and they're hoping to use the study to look at getting Glen Canyon Dam hydropower certified as environmentally preferable power. The study should be completed this year and WAPA will give a presentation if desired.

► **ACTION ITEM**: The TWG will determine whether they desire to have WAPA make a presentation on this project.

► **ACTION ITEM**: Ken McMullen will provide an annual report on work accomplished by the NPS Permitting position. He'll provide that report in January.

► **ACTION ITEM**: Dennis will forward the Ancillary Projects List to the POAHG for action.

Update on In-Canyon HBC Translocation in Grand Canyon National Park. Larry Stevens passed out copies of a one-page update (***Attachment 16***) from a presentation made by Bill Leibfried about six months ago. It's a project funded by the NPS and coordinated by NPS with Grand Canyon Wildlands Council as the perpetrator and SWCA as the collaborator. The objective is to look at in-Canyon humpback chub translocation outside the Little Colorado River. Larry said the project won't probably contribute to the overall HBC population but is simply an insurance policy for placing HBC in a stream other than the LCR.

John Hamill questioned why the FWS thinks it's a higher priority to put the fish in a hatchery environment as opposed to doing this type of translocation. Glen said the FWS sees the need for a refuge out of the canyon in case a spill were to happen to the LCR population and there was a catastrophic loss of HBC in Grand Canyon, they want to create an out of the system refuge population. They have 83 fish at Willow Beach but they don't think that is enough. They're depending on the Genetics Management Plan to tell them what that

number is that they should have out of the canyon but they feel a need to get additional fish out of the canyon. It's an insurance policy should the worst happen. The idea of doing it out of the canyon is because in part they want to monitor the fish closely and also be able to collect them easily and use them if needed. They don't think it's pragmatic for a place like Shinumo Creek. With regard to translocation, the FWS see that as an important piece of the puzzle and a valuable conservation tool. They see Havasu as a higher priority because it has a much higher carrying capacity and makes more sense for translocation.

FY07 Hydrograph, Budget, and Workplan (Attachment 17). John Hamill said the three options were developed based upon guidance from the Secretary's Designee that FY07 was to be viewed as a transition year and stay the course until a long-term plan was agreed upon. He reviewed the three options:

1. ROD Flows (MLFF)

2a. Steady late summer-fall flows (**Oct 2006** would be 6-9K, **Sep 2007** steady 8K, otherwise ROD)
2b. Same as Option 2a but with winter fluctuations (winter fluctuations would be 5-20 Monday through Saturday December through February, steady **5-8K** on Sunday, and ramping rates of 5,000 up and **4,000** down. Purpose is not to suppress trout though there might be some impacts but to mitigate effects to power.

3. **Begin Stable Flows – MLFF w/Equal Monthly Volumes (Oct through Jul) then stable 10,000 cfs (Aug-Sept).**

He asked if the TWG had other options they wanted for consideration.

Mary Barger noted a correction on John's handout stating that the ramp rates used last year were 5,000 cfs up and 2,500 cfs down which was also done the last 3 years. She also said that Sundays were actually 5-8, not steady 8. John corrected #2b to read:

2b. Same as Option 2a but with winter fluctuations (winter fluctuations would be 5-20 Monday through Saturday, December through February, steady **5-8K** on Sunday, and ramping rates of 5,000 up and **2,500** down. Purpose is not to suppress trout, though there might be some impacts, but to mitigate effects to hydropower.

Based on yesterday's discussion, Larry said two weeks is not long enough to detect biological change as far as the data and previous studies have also indicated that that's just not a long enough time. So one thought might be to keep steady flows for the whole month of September and actually test that. He added that almost everything shuts down after the 15th of October in terms of the winter process so September is a month in which there could be some detection of a biological response if fish are in nearshore environments. He suggested doing steady 8 in September and 6-9 in October because biologically it makes more sense for that particular resource.

Dennis told John that one modification might be to talk about whether there is such a difference between August and September. Referring to the hydrographs discussed yesterday, there was a tiering down out of August into September and he thought the Fish and Wildlife Service would want that to be considered. It actually has an advantage for the hydropower community as well because they get higher fluctuations early in September and don't have to drop the bottom out from under the fish (rapidly reduce releases) in the monthly transition.

Glen said the FWS feels August and September are the most important months for survivorship of juvenile HBC being flushed out of the LCR with monsoonal storm into the mainstem. If a steady flow in those fall months could be made, nearshore habitats in the mainstem could be improved and perhaps also improve survivorship of young HBC in the mainstem that would be closer to the LCR. He agreed with Larry that two weeks doesn't provide much information and that a month would tell more about the difference between a steady 8 flow and a flow of 6.5 -9. He concurred that September is a much warmer month when doing a

steadier flow and that it would have a much bigger difference on the fish because in October it's starting to get cold enough that it doesn't make much of a difference.

John said that Option #3 was proposed by Grand Canyon Trust. He referenced the letter Rick Johnson distributed yesterday. There was some concern on which flows would require NEPA compliance. Dennis said he thought both 2 and 3 and 3 because of its potential effects on the human environment which also has effects on hydropower production. The second one may only require a follow-up supplemental review because it will only be carried through October 2007. However, he asked GCMRC staff what negative effects they thought there might be for the purpose of considering a FONSI because when this was first done, it was thought to be a benefit to HBC through suppression of trout but now it's considered hydropower mitigation. The NEPA document would have to provide what negative effects are recurring.

Ted responded that winter fluctuations export more sand than MLFF but he couldn't provide the exact numbers. There will be some sediment loss in the system as a result of those fluctuating flows. Matthew added that one of the difficulties in responding is there isn't a lot of data, however, this is probably the time of year when biologically the system can most absorb these kinds of perturbations but it's not going to be helpful. They would expect if there are those larger ranges, those areas that are exposed to desiccation and potentially to freezing, are not going to be favoring any kind of vegetation production so that probably is not a positive for the system. He said GCRMC doesn't have that data but there is some potential for recovery at that time. Those kinds of fluctuations aren't going to favor the primary producers but it is the time of year when their growth is at the slowest.

Dennis asked what the compensatory responses on trout would be. Bill Persons said they're seeing trout densities down throughout the river but don't know what's going on in there, whether it's a food base bottom up effect or not. This will reduce spawning probably to below 5,000 cfs during those months there are fluctuations. With impacts of the flows on trout there is some compensatory survival but he doesn't think it would be a good thing for rainbow trout in the Lees Ferry Reach and wouldn't expect any impacts further downstream just because of the attenuation. He would like to see Josh Korman's work continue under a year of closer to ROD operations.

Helen Fairley said the proposed season is concurrent with the period of time when Grand Canyon limits the recreational use of the river to people who are seeking a non-motorized recreation experiences. It does have impacts to that segment to the recreational population that are seeking to have a more wilderness-like experience. Larry also said that as a commercial river runner, he appreciates having fluctuations in flows for the ability to choose what stage to run a rapid. John O'Brien cautioned that this will be the first year of a new Colorado River Management Plan (CRMP) so more permits will be given out to more private boaters on the river this winter and early spring. They will likely be less experienced and consequently people are likely to get stranded.

Norm asked why the stable flow experiment would not be covered under the existing ROD MLFF. Dennis said the EIS is over 10 years old and the calculations of the effect on the hydropower are probably considerably different than when they were then and this alternative also wasn't evaluated in the EIS.

Since Rick was not in attendance today, John O'Brien was asked if he wanted speak on behalf of Andre Potochnik as the BHBF proposal was his idea. John said a question that he had was that if there were a trigger in March then he thought a March BHBF might work, but if there was a trigger in September that wouldn't do much good to have fluctuating flows all winter and then do a BHBF. To him it doesn't make sense to do an experiment if there isn't money to monitor the results of the experiment. He went on to say that if a BHBF is done and then 5-20K cfs is run afterward for 3 months, there may be bars underneath the surface and one is likely to see active removal of what's above the water level.

Dennis said that the BHBF, as a mitigating action, is one of the ways to look at it but it's questionable whether to follow with high fluctuations as that might negate the mitigation effect of the BHBF.

As GCMRC has been assessing inputs from the Paria this past week, Ted said the Little Colorado River may have peaked as high as 10,000 by now at the confluence. They're getting sand inputs but he couldn't tell where they are relative to the experimental trigger that was agreed to 4 years ago. The question that's going through their minds as scientists is if they're in a triggering mode, and have exceeded or met the trigger this fall, winter, spring, whatever the time frame, they're not real clear as to whether they should be getting ready to do anything other than just monitoring or not. If the BHBF is done in the same year that the input trigger is met, he thinks they're safe in saying that there is some reason to believe it might have a benefit to the environment. Since 2004 they've tried to look at retention of the second inputs that came in January in 05 and those inputs which came to about 1.5 million tons after the 04 experiment, were actually retained in the system for much longer than was originally predicted. At the March 2006 AMWG meeting Scott Wright said they're still in the triggering mode based on the input from January 05 so the idea that these inputs don't tend to accumulate over many years, is still upheld in the peer reviewed literature. The question for him is do they have the latitude to do something, mitigate it with the input in terms of a high flow in the same year, or maybe year and a half time frame after the inputs occur. Now they're in the mode where they may be getting another triggering episode but aren't sure if there will be any response other than just continue monitoring the fate of those inputs.

Assuming the trigger was met, John Hamill asked what could be learned from doing a BHBF in March. Ted said they would have the opportunity to replicate in a sense the BHBF for the same duration and magnitude under perhaps similar enriched conditions as November 2004. The basic question is related to replication of an 04 type scenario, enriched BHBF, and then comparing in the mass balance of sand inputs vs. efflux or export and bar response whether or not this was again a similar positive response. Ted said there are enough studies in place to do the mass flux which is this suspended input vs. export. They don't have anything scheduled necessarily to do repeat sandbar measurements and haven't advocated doing complete systemwide overflights again until 2009. They would have part of the dataset that was collected in 04 and would replicate the treatment but wouldn't necessarily replicate all of the data collection perhaps until as late as 2009.

Lloyd said one of the reasons he voted against this at the SPG meeting was because it was proposed that the BHBF was already a management action and that we would simply go ahead and do it in March with no intensive follow-up but normal monitoring. He's not sure that we can forego that period after performing a BHBF and not do some intensive beach measuring and do some downstream monitoring or analyses. This thing was "let's do it."

Kurt asked if anyone was prepared to propose a motion.

Lloyd Greiner proposed the following motion: Move that the hydrograph for 2007 not include any BHBF. Motion seconded by Ken McMullen.

***C**: I would like to add that the sediment also is a resource with a value. It's one of the limited resources and as that goes away, we have an opportunity, there's a certain amount of time and space in the system and we heard some information from the Bureau within the last year that it could be $4-10 million a year to put the equivalent of a sediment trigger into the system by pumping. Nothing about this ecosystem is cheap. If we ignore it, it's costing money. It's costing resources. If we do a lab re-treatment, it's costing money. So like Mary said, there's a cost in water and power to do a BHBF flow. We don't want to be kidding ourselves that if we just don't do it, we can't see the sediment that is moving out of the system so it really didn't cost us anything. It's an opportunity of maybe $4-5 million a year and in the last 4 or 5 years we've seen -- We're kind of fat right now and there's potential that we haven't triggered this year and we had two triggers last year, and triggers are easy to come by but over the last 5 years we sat around doing NEPA and everybody was ready to go and everybody was watching the Paria Gage and we didn't get a trigger for quite awhile. We need to understand that we're on hydrologic time here and hopefully we can get the science to where we can make the most out of this sediment when we get it and understand that there may be periods of years like with water where we don't get and that makes it more important to use it when we've got it. (O'Brien)*

***C**: One thing that might help is that all the options looking to the future have a lower trigger because it's a combination of the Paria and the LCR so we hope we'll get to the next opportunity sooner. (Kubly)*

MOTION: Move that the hydrograph for 07 not include any BHBF.
Motion seconded (McMullen)
Voting Results: Yes = 14 No = 8 Abstaining = 0
Motion carries.

Stakeholder	Vote	Stakeholder	Vote
AZ Game & Fish	Y	Grand Canyon Trust	absent
Bureau of Indian Affairs	N	Grand Canyon Wildlands Council	N
Bureau of Reclamation	Y	Federation of Fly Fishers	Y
Hopi Tribe	N	Grand Canyon River Guides	N
Hualapai Tribe	N	Arizona	Y
NPS -Grand Canyon	Y	California	Absent
NPS - GLNRA	Y	Colorado	Absent
Navajo Nation	N	Nevada	Y
Pueblo of Zuni	N	New Mexico	Y
San Juan Southern Paiute Tribe	absent	Utah	Y
Southern Paiute Consortium	N	Wyoming	Y
U.S. Fish and Wildlife Service	Y	Colorado River Energy Distributors Assn.	Y
Western Area Power Administration	Y	Utah Associated Municipal Power Systems	Y
		VOTING RESULTS:	
		Yes =	14
		No =	8
		Abstaining =	0
		Motion Passes	

Bill Werner asked Dennis that if additional NEPA compliance was needed, how much time would be required. Dennis said he thought NEPA compliance could be completed by October 1. Glen said that ESA compliance could also be completed by October 1.

The group discussed what would be the best method for voting on option 2a and 2b:

Comments:

- What happened in the SPG discussion after the ROD proposal was discussed, #2 was brought up and the potential of moving, it becomes a movement between one and three whereby you try to move a steady flow into it and when you try a steady flow into it, then you try to mitigate that with the least impacting operations for power to offset. That's where that 2 really comes from. The real issue here and it's the issue we'll visit again when we look at the long-term experiment. The real issue is steady flows and fluctuating flows and so what we tried to get at was where is the support and then try to go from there but you can work it any way you want to. (Garrett)
- I just thought the way it worked in the SPG was that we voted on 1 and 2 and then once we voted for 2, then we voted for 2a or 2b. In this case, wouldn't it make more sense to pull that 2a out as a separate alternative so you can vote on that directly. It would make more sense to me. (Henderson)
- The other option and the way the SPG did it was they voted between 1 and 2 to basically figure out whether there was initial support for doing steady flows and then they came back and said that if we do steady flows, should we do it with this constraint added, or this additional factor added. (Hamill)
- We need two constructive motions. (Kubly)
- The only other little piece of this is the cost on each of these. I mentioned this yesterday. With the economic analysis being done now, there is a differential cost for each of these and we just don't have that information. (Barger)

- Get a hydrograph and we'll figure out what kind of experiment you can run. We've got some time and money invested in ongoing experiments and as a group, it wouldn't be good for us to go forward in saying well, you'd hate to have a bunch of half finished experiments. (O'Brien)
- I don't see it as an experiment. If you're saying we're doing winter fluctuations and we've dropped the idea that it's an experiment around trout suppression and clearly it's to mitigate effects to power, where's the experiment? Where's the unknown? We know that there will be benefits to hydropower. It's no longer a trout experiment so it's a change in policy for some advantage but it's not a test per se. It's not that we don't know the outcome. We've measured those for 3 years at least the sandbar and the sand flux. Call it a test but it's really what's the question we're trying to answer with the test. A lot of it's known. The economics are more or less known. The sand flux response is known. There may be some other studies that haven't been going on but it's okay to say that we want to have a policy to provide more benefit for resource but with this being posed as a test, I don't know what the question is. When scientists have to address a question, what is the question that we'll be trying to answer? (Melis)
- I think it's worth mentioning that those winter flows do seem to have at least some, if not a large negative, impact on the Lees Ferry trout population whether we're thinking about that in terms of the recreational angling community or in terms of the experiments in monitoring that Korman is doing. That's going to have a negative impact on both of those in my view. I don't think we're going to see a very robust population in a year following those treatments and certainly it's going to be harder for Josh to count redds that are not there. I think those negative impacts ought to be considered. (Andersen)
- Our job today is to look at the work plan and budget and we're running out of time. What I hear you saying is that this work plan and budget does not take into consideration any thing other than ROD flows right now so for us to be tinkering around with trying to come up with a modification to the work plan and budget right now I don't know how we have time to do all of that. We don't know what the implications are to the work plan or to the budget with this. We have it right now in front of us what is being proposed and it doesn't include anything other than #1. (Davis)

Motion 2 (Bill Persons): Move to vote on 2a and 2b and decide on which to vote on a primary motion.

Stakeholder	A	B	Abstain	Stakeholder	A	B	Abstain
AZ Game & Fish			A	Grand Canyon Trust	absent		
Bureau of Indian Affairs		Y		Grand Canyon Wildlands Council	Y		
Bureau of Reclamation			A	Federation of Fly Fishers			A
Hopi Tribe	Y			Grand Canyon River Guides	Y		
Hualapai Tribe	Y			Arizona		Y	
NPS –Grand Canyon	Y			California	absent		
NPS – GLNRA	Y			Colorado	absent		
Navajo Nation	Y			Nevada		Y	
Pueblo of Zuni	Y			New Mexico		Y	
SJ Southern Paiute Tribe	absent			Utah		Y	
Southern Paiute Consortium	Y			Wyoming		Y	
USFWS	Y			CREDA		Y	
WAPA		Y		UAMPS		Y	
				VOTING RESULTS:			
				Yes =	10	9	
				No =			
				Abstaining =			3

Bill Persons (abstaining): I have another option that I prefer. It's on the board. I'm abstaining on A&B. I'll vote no on both of them.

Motion 3: Voting on all three options:
1. ROD Flows (MLFF)

2. Steady late summer-fall flows (Oct 2006 would be 6-9K, Sep 2007 steady 8K, otherwise ROD)
3. Begin Stable Flows - MLFF w/Equal Monthly Volumes (Oct through Jul) then stable 10,000 cfs (Aug-Sept)

Stakeholder	1	2	3	Stakeholder	1	2	3
AZ Game & Fish	Y			Grand Canyon Trust	absent		
Bureau of Indian Affairs		Y		Grand Canyon Wildlands Council		Y	
Bureau of Reclamation	Y			Federation of Fly Fishers	Y		
Hopi Tribe	Y			Grand Canyon River Guides		Y	
Hualapai Tribe	Y			Arizona	Y		
NPS –Grand Canyon		Y		California	absent		
NPS – GLNRA		Y		Colorado	absent		
Navajo Nation	Y			Nevada	Y		
Pueblo of Zuni	Y			New Mexico	Y		
SJ Southern Paiute Tribe	absent			Utah	Y		
Southern Paiute Consortium	Y			Wyoming	Y		
USFWS		Y		CREDA	Y		
WAPA	Y			UAMPS	Y		
				VOTING RESULTS:			
				Option 1 =	16		
				Option 2 =		6	
				Option 3 =			0

Annual Work Plan and Budget. Kurt told the group they have the option of putting some of the after lunch agenda items off to the next TWG meeting but the remaining priority for the meeting was to make a recommendation to the AMWG on regarding the FY07 annual work plan and budget. He asked the members to provide any substantive concerns they have on either the budget or work plan rather than going through the work plan project by project. He reviewed the list of concerns he had captured and asked for any additional concerns so that GCMRC could respond.

1. Process. Norm wasn't happy with how the process is in reviewing the work plan and budget. There was some discussion about the process, reviewing the 07 annual work plan and budget took place and there were some comments made by the SPG but there wasn't a revised version of it. That was one of the issues.

2. Submerged Aquatic Vegetation. Kurt said he wasn't sure if this was still an issue or if it's more of an issue that relates to when does the experimental action turn into a management action.

3. Mechanical Removal. Mary said this was brought up at the SPG meeting because WAPA feels that mechanical removal should always be available to turn it on for any of the non-natives, not just rainbow trout. They don't want to use it for RBT this year but may want to use it for warm water fish should they have future problems. They want the option to leave it on the table. They weren't clear on whether it should be funded, but wanted it as a possibility every year to turn it on.

4. RBT PEP. Dennis asked where the funding was for this project. John said the dollars came from two sources. The first source was in a proposal today on the SAV project to extend that over two years instead of one year so it was originally proposed as $96,000 for FY07. As a 2-year project, it's only $48,000 in FY07 so that gave Korman $48,000. The second is that they've been working with WAPA to have them do the economic analysis that was called for in the 07 work plan. That work plan will largely be done and WAPA will do that at no cost to the program. There will be some costs for peer review of those products of the work plan as well as the report and right now GCMRC is hoping to cover that with some end of year funds that are in GCMRC's budget at a savings of $146,000.

Dennis said that presuming the decision on the experimental options is some mix or it's something different then they're going to have to do compliance, there will have to be another economic analysis on whatever the preferred alternative is. He asked if WAPA would take on the same responsibility then so GCMRC doesn't have to reserve dollars in 2007.

John said they haven't had those discussions with Western so he can't answer that, however, he did set aside $250,000 to support NEPA compliance in 07. They left that in the Bureau's budget so there is that money available to support whatever compliance is necessary associated with the long-term experimental plan.

5. Terrestrial Map/Monitoring. John said this was listed as a concern because there were some questions about the scope of the project and the agreement was that they would sit down with Larry and discuss with him what had to be done. Larry said he has looked through the plans for this next year and since it is being considered a transition year, everything is fine. He anticipates improvement of the conceptual part of that project.

- *In looking at the presentations, they are looking at 140 sites down the canyon to look at determining impacts of dam operations on terrestrial vegetation seems like a bit of a push. I'm not sure we need to have 140 sites monitored on whatever basis to determine dam effects. If we're trying to determine an absolute growth of vegetation on the shoreline, then maybe we need more than 140 sites. I don't know. It's a question of what we're trying to do with the program. If it's a compliance program trying to determine how to reduce impacts of the dam on terrestrial vegetation, I submit that you don't need 140 sites to determine that but if you're trying to determine the environment of the Grand Canyon, then maybe 140 sites is not enough. I don't know where to offer that kind of comment and I don't know how to input that into the scope of the project other than say it right now. My impression was that we don't have a basis for doing this on the algae so this is just sort of a guess. We've never applied this method before that we're doing right now so its ability to measure is going to be a new stab. In terms of trying to determine the impacts of the dam operation on algae quantitatively, I don't think you're going to be able to do it period. Whether or not we're trying to do qualitatively in five miles, you might be able to do it so I don't really know why the five miles. It seems a little bit excessive to try to determine whether a particular dam operating regime will have an effect upon the algae. (Davis)*
- *The great strength of those sampling transects and monitoring was working towards a remote sensing system to be able to do a great deal of its work with a minimum of the field sampling but at this time it's critical to be able to make that linkage to look at remote data especially images and be able to do the ground proofing to see how closely those are related. That requires this work upfront of 140 sites and the initial sampling to have that confidence that we know how to interpret remote data and eventually be able to look at changes that are a product of dam ops, climate, or both. There are some very desirable goals down the road. (Andersen)*
- *So the statistical design for that sampling came out of the 2000 PEP and very sophisticated statistical analysis went into the design so the 140 sites and the array of sites, 60 sites get monitored for a year gives you the variability, continuity, relationship to stage. The questions have matured a great deal since the year 2000 and that hopefully will be what the PEP addresses and begins to update but until that happens, you really can't do better than that. (Stevens)*
- *I agree with Bill. I have a similar concern about this one. I think it would be good information to have but I think it's a resolution that we don't necessarily need. My hope is that the other foodbase work will pick up a lot of this. My concern has to do with the LCR modeling. It's actually the HBC monitoring in the LCR and the population estimates information. I thought we had worked this out and I hate to have to bring it to you at this time because I thought we would have this sorted out by now. We're 45K short of where we need to be to conduct that work. The decision as I understand it is to conduct the population estimate in 2007 and 2008 in the same way we've been doing it until we do the HBC monitoring PEP and after we have the PEP review, it's very likely that we could institute some changes but it looks as though for the next two years we will probably do things pretty much the same way we have and in splitting these projects out this year, for some reason, we didn't communicate that we needed the level of funding that we've got in the budget. So my proposal would be to move the funding for the SAV project to LCR lower 15 kilometer long-term monitoring. (Knowles)*

6. Foodbase Program. Mary said that Argonne National Labs worked with different people to try to put together the food base program. They sent that to GCMRC and asked if they could make sure that was incorporated into their food base plan but never heard back. She wanted to know the status of the work.

John said he thought they had dealt with it, but recalled that Kurt had sent a memo to the chair of the SPG asking the SPG consider that. He thought the decision was to not address this fiscal year given the fact that it came in a few days before the SPG meeting and they didn't have the time to sit down and take an in-depth review of the proposal. There seemed to be a lot of overlap between what was already going on and John's preference was to deliberate further and include in next year's work plan.

Kurt said there is no process in place for evaluating proposals and considering them. His recommendation is that TWG members submit them to GCMRC and have them evaluated on their merits and then GCMRC would come back and provide a recommendation to the TWG. At that point, the TWG could discuss further and send a recommendation up to the AMWG.

Ted Kennedy said the foodbase RFP that went out had been reviewed by the science advisors. The proposals themselves were externally reviewed. The focus of the new work was trying to get a better understanding of important trophic regions in the system and get a better handle on the key resources that should be looked at and also get a better understanding of how food availability is tied to distribution and abundance.

Kurt said that since GCMRC has not reviewed this proposal on its merits, he is hesitant to incorporate it into the FY07 without that full analysis. He asked how the group wanted to deal with the recommendation to eliminate this project. It was decided to hold off doing any voting until all the projects had been identified.

6. LCR Gage. John said $30K was added to continue the operation and that was done at the request of the SPG.

7. Cultural Resources. Mary said the CRAHG met last night. They reviewed the Site Assessment Paper that Mike Yeatts had written and he agreed to do some minor rewrites and also include a paragraph that clarifies Section 106 and how it fits with the program. Mary also said that Helen Fairley has money set aside to have the Park Service assist in doing the assessments and other things; however, they suggested the money should be run out of the Bureau to save burden costs.

The CRAHG also talked about the other budget issues because they never had a chance to go through them and one of them was Helen's proposal to compare the legacy monitoring data against historic flow data to see if effects on sites are a result of dam operations. Another project was looking at historically remote sensing data to detect change. Mary said the group had previously recommended another project that was not put in Helen's budget and that was how effective is the tribal component in the adaptive management program. The tribes had a lot of questions at last night's meeting and John has decided to roll that into a workshop that he's doing on just effectiveness of the adaptive management program. The tribes would be invited to participate in the workshop.

Mary said one of the things that Helen was proposing to do was set weather stations in the canyon to study check dam efficacy and perhaps some of the aeolian studies that were done by Amy Draut. There was an individual in the group that did not agree with that study and was uncomfortable with funding that. There was also the comment that in the past we had requested other programs to fund the weather stations, not just the cultural program because it was felt that in particular the terrestrial program could benefit from understanding localized events in the Grand Canyon but that didn't happen. Helen explained that no one else wanted to fund it at GCRMC.

Bill Davis said he was trying to figure out the extent of where the studies are going take place and it wasn't clear to him how high (in elevation) they were intending to go. Mary said the site assessment is to set up the long-term monitoring so there was a discussion at the CRAHG about the sites that have been agreed to be treated for as part of Section 106 by the Bureau of Reclamation and the NPS. There were 161 sites and there were approximately a similar number left over from the EIS studies and Helen wanted to do a site assessment initially. Her proposal was to assess all of those sites. In working with the NPS, they

determined there were actually 147 additional sites so some CRAHG members recommended to not assess all 147 so Helen offered to do a GIS analysis of where those sites were in relationship to the sites that were being proposed for treatment and evaluation for treatment by the Bureau of Reclamation and the NPS. Helen's studies showed there were still some problems as to where the sites were located but it definitely did show that there were sites in that pool that are above 100,000 cfs, above 120, above 170, and probably above 210. The group did have some discussions about maybe that was too high to be going for long-term monitoring and if you weren't going to monitor up there, why would you assess them. The issue was that the Park Service said that they're going to have to do some monitoring of some of those sites for the CRMP and if we did the assessment, it would be a value to the Park Service for their monitoring under the CRMP. So while they somewhat agreed that Helen does her assessment of the 147 sites, it would be a sample of those sites based on an analysis of the NPS monitoring legacy data as well as the assessment data that Jonathan has done in the canyon for treatment. It will be a subset of the 147 but right now Helen couldn't say which sites might be above 30K, 60K, 174K.

Mary said Jan Balsom told her that if the sample of sites chosen for long-term monitoring under GCPA are below 120,000, that was fine with her because the Park Service could pick up the ones that were at the upper level. So if they wanted to look at flow data, they could do that with the Park Service because they do have some funding to do GCPA monitoring. They just want to make sure that whatever sites are monitored for either GCPA or CRMP by the Park Service or Helen's contractors, that they're done in exactly the same way so they can share data back and forth. So this year they'll come up with those monitoring protocols as well as the sample of sites that will be monitored but part of the sample of sites that will be monitored will be what could be left over from treatment so the 151 sites that the Bureau of Reclamation is proposing to evaluate for treatment, not all of those sites are going to be treated so some of those sites would be available for monitoring as well.

Mary said there were only minor changes made in the CRAHG budget resulting in a savings of $4,000 which she would like to propose going to the food base program.

8. NPS Permit Funding. Kurt said this item was already taken care of.

9. Economic Assessment. Norm said that in reading the budget, the cost is $96,000 for two years, not one at $96,000. He wondered if it is now a 4-year project. John said it is a 2-year project at $48,000 each year for a total of $96K for 2 years. Matthew said that Josh gave him a preliminary proposal and budget but feels there needs to be more review and discussion before moving forward.

Ken said the Park Service would kind of like to see the issue of migration downstream. It was his understanding a few years ago that the work was started but then for whatever reason stopped. They would like to see if there is a genetic link between Lees Ferry trout and the trout they're seeing downstream as a means to start addressing that issue. That would be one aspect that we'd like to start.

Dennis said he'd like to advocate and have a discussion on that $48,000. There are three places that it can go: (1) fund SAV, (2) Glen's request for $45,000, and (3) could be part or all of what Josh needs.

John reminded the TWG that there are some fundamental issues about how to approach that project. He would like GCMRC to figure out what the key drivers are and then design a monitoring program. That's the process that was recommended through the science review process and the process they all agreed to and he doesn't see any reason to deviate from it. He feels it would be more appropriately dealt with in the FY08 work plan.

Gary Burton said there were two components that were added to WAPA's Option 3 that became Option 1 for long-term experimental plan to complete it and one of those was this foodbase, while the other one was HBC juvenile evaluation. If that wasn't timely, he wanted to know how they should proceed in the future

because they really were added as supplements to programs that were already out there as opposed to replacing those or changing them in any way.

John said the TWG was set up to review program priorities and it's their responsibility to review the priorities and projects for each fiscal year. He doesn't want to start a process whereby stakeholders can submit projects too late to be evaluated for the upcoming budget. He feels there needs to be a more structured process in the future.

Kurt said he wanted the TWG to focus on the three issues and asked if anyone wanted to propose a motion.

Kerry proposed the following motion: Move to choose one of three projects for a funding level of $48,000K: 1) HBC, 2) SAV, 3) Redds work by Josh Korman.
Motion seconded by Norm Henderson.

Comments:

- *I'd be interested in knowing if there's any way we can get a minimum amount of data on the redds given that there won't be fluctuating flows. If the AMWG accepts our recommendation for the FY07 hydrograph and the Secretary does, then there won't be fluctuating flows in the winter. Then back when we were thinking in terms of titration and turning treatments off, we've got a 3-year treatment that's been turned off and it would be great to get some data on the redds. Somehow we ought to be able to get that redd data some of it, maybe just one date or two dates, or something less than a full 100 grand. I don't know if anyone has that information. (O'Brien)*
- *I believe this is a technical point. Removing $48K from the SAV is largely a reduction in GCMRC salaries and the elimination of what I think is some very important, valuable work. The HBC project that Glen has mentioned in their view is under funded but it is not unfunded. I think potentially that could be an understanding from the way that motion is phrased that it is an either or choice and I don't think that's quite accurate. We're suffering a little bit because I haven't been able to present all of the budget information that I had intended but we have largely eliminated our primary cooperator in this budget. SWCA is largely gone and I have asked the cooperators, including ourselves, to sharpen pencils and see how it can be made to happen as Govt. employees often have to do. It's fair to say that I found AGFD a little bit more responsive to that request so there is a level of funding for the Service that is less than they have requested but it's not that we will be able to do that work or not based on this $48K but will the Service be funded at the level they have requested or not is a more accurate way to help them. (Andersen)*
- *Josh Korman started this program to investigate the effects of fluctuating flows on trout spawning and early survival. He did that under a period of higher fluctuating flows. The control was to be a period of ROD operations (with lower fluctuating flows) and then to compare those two. To my mind, I could say you could justify some of the costs from the experimental flow fund because it's being done to address an experimental flow. I know we want to keep as money as we can in that fund but I guess I would argue that this seems to be a reasonable expense or a reasonable use of the experimental flow fund although I hate to raid it. (Persons)*

MOTION: Move to choose one of three projects for a funding level of $48,000K: 1) HBC, 2) SAV, 3) Redds work by Josh Korman

Stakeholder	HBC	SAV	Redds	Stakeholder	HBC	SAV	Redds
AZ Game & Fish	A			Grand Canyon Trust	absent		
Bureau of Indian Affairs		Y		Grand Canyon Wildlands Council	Y		
Bureau of Reclamation			Y	Federation of Fly Fishers	absent		
Hopi Tribe	A			Grand Canyon River Guides			Y
Hualapai Tribe			Y	Arizona	Y		
NPS -Grand Canyon			Y	California	absent		
NPS - GLNRA			Y	Colorado	absent		
Navajo Nation	absent			Nevada			Y
Pueblo of Zuni	Y			New Mexico			Y
SJ Southern Paiute Tribe	absent			Utah			
Southern Paiute Consortium			Y	Wyoming	Y		
USFWS	Y			CREDA			Y
WAPA	Y			UAMPS	Y		
				VOTING RESULTS:			
				Yes =	7	1	9
				No =			
				Abstaining =	2		

Larry said he had two comments: (1) one of the most contentious issues facing the TWG is evaluation of steady flows and the opportunities to test steady flows were conducted quite thoroughly in 2000 but there has been no synthesis of those data. He suggested that perhaps the TWG put together a synthesis of the effects of steady flows from the year 2000, the tradeoffs between economics, and the benefit to chub since there is now a 5-year perspective on what those impacts might have been. In doing so, it might help clarify some of the conflicts the group faces and may even resolve some of the issues as to what is of value to which resources. He proposed chairing a small ad hoc group to put together a document on the effects of year 2000 flows. (2) Larry said the group still needs a flow plan. Without that plan, long-term planning is still up in the air and he would recommend that that be a question driven flow plan rather than a designer flow program. Kurt said he didn't want to set up an ad hoc group at this time because he wanted the TWG to focus on making a recommendation on the FY07 hydrograph, budget and work plan to AMWG in preparation for their conference call on Sept. 6, 2006.

Norm said he felt there needed to be an additional planning effort for the budget process to address some of these concerns about process, about how to handle budgets, long-term planning with the MRP, and how the MRP and the Annual Work plan mesh together. He felt there should be more deliberations either by an SPG group or some kind of group. Knowing that Dave Garrett's contract with GCMRC ends on Sept. 30, Norm wondered if Dave was going to continue the effort. John said he feels the AMP needs to look at the overall structure in relation to the roles and responsibilities of different groups and what the groups are going to do. He would like to see Dave Garrett make a report on what remains to be done. However, he doesn't know how until there is a broader discussion of what's going on in this program in terms of the various committees and what their long-term responsibility is.

Larry Stevens made the following motion: Approve and recommend to the AMWG the Draft GCMRC FY07 Work Plan and budget as updated today.
Kerry Christensen seconded the motion.

Comments:

- *Regarding #1, I didn't participate in any conference call and if that's the information that was used to discuss today then to date, that supersedes all that so #1 is superfluous as well. (Groseclose)*
- *There were lots of comments brought in to the conversation. There are a lot of things that I brought up at the SPG that I didn't bring up here. There was a lot of stuff that I as a TWG member would've commented on today in great detail except for the fact that I have already done that through the SPG and to just say that doesn't matter anymore*

because we've addressed it here, is not correct because it was not addressed today because I assumed it was covered by that meeting and those meeting notes that were never incorporated. If you take that out, we've lost a huge chunk of work that I think is very important as far as the budget process goes or the work plan goes. (Henderson)

- *I thought that the revisions that were recommended by that group are what we are voting on. (Persons)*
- *Would an option be to identify through the minutes that one of the agreements in the meeting today was to make those revisions. If GCMRC will agree to that, it doesn't need to be stipulated any more specifically than that and #1 can go away. (Kubly)*

MOTION: Approve and recommend to the AMWG the draft GCMRC FY07 Work Plan (updated 6/26/06) and budget (dated 7/28/06), and BOR budget/work plan (dated 7/28/06) subject to the following:

1. Provide the TWG/AMWG a final FY07 workplan/budget in time for the fall AMWG meeting.

2. Provide the AMWG an analysis by the TWG Chair of the budget review process used in FY07 with suggested changes for improvement.

3. Incorporates the discussion and agreements from the August 3 TWG meeting

Motion seconded.
Motion passed by consensus.

Attachment 18 = TWG Chair Report to the Adaptive Management Work Group on Actions Taken by the Technical Work Group at their August 2-3, 2006, Meeting

Attachment 19 = TWG Chair Report to the Secretary's Designee and the Adaptive Management Work Group Concerning the Results of a Technical Work Group Teleconference Call dated October 6, 2006

Adjourned: 3:10 p.m.

Respectfully submitted,

Linda Whetton
U.S. Bureau of Reclamation
Salt Lake City, Utah

General Key to Adaptive Management Program Acronyms

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

Q/A/C/R = Question/**A**nswer/**C**omment/**R**esponse