

**Minutes of Technical Work Group Meeting
February 17-18, 1998**

FINAL

Presiding: Robert Winfree, NPS (Chairperson)

Committee Members Present:

Clifford Barrett, RW Beck & Assoc.
Kerry Christensen, Hualapai Nation
Dave Cohen, Trout Unlimited
Wayne Cook, UCRC
Wm. Davis, EcoPlan Assoc./CREDA
Kurt Dongoske, The Hopi Tribe
Christopher Harris, ADWR
Norm Henderson, GCNRA
Pamela Hyde, American Rivers

Gene Jencsok, CWCB
Robert King, UDWR
Phillip S. Lehr, CRCN
Carlos Mayo, Southern Paiute Consortium
Tom Moody, Grand Canyon Trust
Bruce Moore, USBR
Clayton Palmer, WAPA
Bill Persons, AGFD
Andre Potochnik, Grand Canyon River Guides
Fred Worthley, CRBC

Committee Members Absent:

Mark T. Anderson, USGS
Joe Dishta, Pueblo of Zuni
Alan Downer, Navajo Nation

Owen Gorman, USFWS
Amy Heuslein, BIA
John Shields, Wyoming State Engineer's
Office

Alternates Present:

Larry Sibala, BIA
Wayne Cook, UCRC

Amy Heuslein, BIA
John Shields, Wyoming State Engineer's
Office

Alternate For:

Other Interested Persons Present:

L. David Garrett, GCMRC
Barry Gold, GCMRC
Steven Lloyd, USBR
Signa Larralde, USBR Albuquerque, NM
Margaret Matter, WAPA Golden, CO

Ted Melis, GCMRC
Tony Morton, USBR
Randy Peterson, USBR
Dave Trueman, USBR Salt Lake City, UT
Michael Yeatts, The Hopi Tribe

Recorder: Serena Mankiller, GCMRC

1/20/98: **Convened:** 9:30 a.m. **Adjourned:** 4:29 p.m.

1/21/98: **Convened:** 8:08 a.m. **Adjourned:** 12:53 p.m.

MEETING OPENING AND ADMINISTRATIVE ITEMS

Welcome/Introductions: Robert Winfree welcomed committee members and guests, who introduced themselves and stated their affiliation.

Review of Agenda: The Chairperson distributed a revised agenda. Committee reviewed the agenda with no revisions. Additions were made to the February 18 agenda.

Attendance Sheet: Distributed.

Review of Minutes: (Attachment 1) Minutes of the last meeting were reviewed and revised.

Recommendation: Minutes were accepted with revisions. GCMRC Secretary to revise the minutes and post the final on the GCMRC web site.

Other Administrative Business

Federal Register Notice: Meetings are being noticed as required.

Meeting Location Update: ADWR has offered their facilities for TWG meetings on the following dates: April 7-8, 1998; June 9-10, 1998. The ADWR offices are located at 500 N. 3rd St., Phoenix, Arizona. The location is close to the airport and shuttle service is available if Chris Harris is notified in advance. Travel time from northern Arizona will be extended by approximately 20 minutes. This change is acceptable to the TWG members.

Meeting Time: Due to the time change in Utah, Steve Lloyd inquired if the TWG is interested in changing its starting time to 8:30 a.m. on day one of the meetings.

Recommendation: The starting time of the meetings will remain at 9:30 a.m. on day one.

Meeting Schedule: Barry Gold reported a change in the Conceptual Modeling Workshop schedule. It will be conducted at the GCMRC offices May 20-22, 1998. He asked if the TWG would consider rescheduling its meeting days to May 18-19, 1998.

Recommendation: The TWG approved the May 18-19, 1998 meeting dates. The TWG will meet on Monday, May 18 from 12:00 p.m. (noon) to 5 p.m., and on Tuesday, May 19 from 8:00 a.m. to 12:00 p.m. (noon) at the GCMRC offices at the Flagstaff Field Center in Flagstaff, Arizona. The USBR will cause the new meeting schedule and location to be noticed in the Federal Register. The GCMRC Secretary will revise the meeting dates on the web page and send out an email/fax to advise the TWG members and other participants.

GCD Video: A video on cavitation damage sustained from the 1983 flood will be shown following the TWG meeting on February 17, 1998.

Reports from Committees and other Official Participants:

GCMRC Monitoring and Research Plans for FY1998 (RFP/Contract Awards).

(Attachment 2) Barry Gold distributed "Sponsored Projects for FY 1998" which lists the contract title and principal investigators for Aquatic Biology, Terrestrial Biology, Conceptual Modeling, Physical Science, Cultural Resources and Socioeconomic. A complete scope of work for may be requested from Barry Gold in person or by e-mail. He inquired if the scopes of work should be posted on the web page.

Recommendation: GCMRC will request scopes of work from the Principle Investigators and post them on the GCMRC AMWG/TWG web site.

Budget Ad Hoc Group: (Attachment 3) Dave Garrett noted that this is not the out year budget protocol information which GCMRC will continue to develop and plans to provide to the TWG this summer.

David Garrett distributed "Proposed Program Estimates" (dated 2/13/98) which is a current (1998-1999) overall summary of the major budget items. The following pages are stepped-down summary items. He asked if this information is sufficient for TWG's decision-making process, and if it is clear how much money is being allocated to various resource areas. FY2000 monitoring technology has been summarized. By then, the conceptual modeling and protocol assessments will be completed and new remotely-sensed technology can be implemented. It was previously a \$1,000,000 one-year expense, but GCMRC now plans to phase it in over approximately 3 years. This less-intrusive monitoring technology will have a 5-10 year use cycle. The initial investment will be a higher cost, then will decline. The Lydar Mapping technology will cost \$400,000-600,000. Bruce Moore and Dave Garrett explained USBR's charges against GCMRC's budget for providing services. Dave Garrett chose to buy GCMRC's services from Salt Lake City USBR because the total is about (23?)% (other programs can take off 50% of budgeted monies). Bruce Moore explained the FY1998 work plan estimates for USBR, including AMWG, TWG and Reclamation support costs for administering the program. The committee members requested a further breakdown and explanation of items (CPA, etc.), especially line items that are changing yearly (KAS, HBC) and how much of the total monies go to the Center for on-the-ground research. Further clarification was requested regarding personnel expenses. Some members requested an organizational chart listing position, GS grade and FTEs allocated. Other members stated they do not want such detailed employee information. Dave Garrett reminded the committee that the FY98-99 budgets reflect a transition that the FY2000 budget will not incur. Also, budget information can be requested and provided as we go forward with projects.

Recommendation: Dave Garrett will include more descriptive text for budget line items, including grouped items and general staffing information. USBR will define each budget item, OGE and CPA expenses. If the TWG requests more detail after its review, that will be provided.

Spillway Gate Extensions Ad Hoc Group: (Attachment 4) Bruce Moore distributed information gleaned from the ad hoc group meeting. NEPA compliance for installing the spillway gate extensions will cost \$2,500,000 to \$3,000,000 mostly consisting of cultural resources surveys. The ad hoc group reviewed information about flows and has confidence in utilizing the spillways so that a big flow will not overtop the dam. The ad hoc group felt that the extensions should not be put on if the spillways can be utilized instead. Concurrence is needed from the TWG after it reviews the information. If approved by the TWG and the AMWG, the recommendation would be forwarded to the Secretary to initiate a ROD modification should it be determined that the gates are not needed. A federal register notice would serve to inform the public. The TWG reviewed the information and discussed varying flow levels, emergency

situations and temporary installation concerns.

Recommendation: Submit comments to Bruce Moore who will draft a paper for the next meeting incorporating the comments and including Figures 1 and 2. It will be placed on the next TWG agenda for further discussion. Tony Morton will give a NEPA issues update regarding the ROD at the next meeting.

Temperature Control Device Update: (Attachments 5, 5a) Dave Trueman distributed a letter dated October 28, 1996, to the Transition Work Group which discussed the feasibility of temperature controls and potential environmental impacts. Although this is not up to date information, the plan that has been in place for over a year has not changed, and an EA will be done on the same areas as indicated in the attachment. An assessment of full impacts will be done which will include a review of costs, Lake Powell impacts, and information gleaned from the Spike Flow and its EA. The assessment will review impacts of warm water releases, and not the method of warming the water. A rough draft has been prepared and is currently in review by several specialists. (The assessment will include the river below Glen Canyon, potentially Lake Mead, and Section 7 consultation.) The assessment will be done on the full range of potential impacts which may occur from releasing warmer water—including facility construction—rather than construction only (which may have been TWG's previous understanding). TWG requested a description of potential operations constraints or impacts of different levels. Dave Trueman plans to have the pre-draft of the EA complete by the end of the calendar year. It will be approximately 100 pages. TWG requested 60 days for review and submittal of comments. The second draft will be complete 1 year later (in FY2000). The plan to prepare an EA rather than an EIS was questioned. Bill Davis expressed concern that for the past few years various fishery biologists have felt that there is significant controversy surrounding this project, and considering the potential risks regarding interaction between native and non-native fish associated with changes in temperature both above and below the dam, and from a power standpoint, an EIS may be more appropriate than an EA. Dave Trueman assured the members that this EA will be exposed to a broad audience and provide much opportunity for public comment, and an EA provides the same kind of feedback. Problems will be captured during the public process when the EA is published. Initial scoping indicated that impacts will be relatively minor. The largest concern is the potential for cooling the reservoir and impacting the shad population. However, it appears that the temperature will not drop substantially in the reservoir and the impacts to shad are considered to be minor. Feedback from FWS and AGFD have indicated that there will be benefits to the trout fishery. AGFD also has concerns about native and non-native fish interaction. Results of potential interaction are unpredictable, and an EA or EIS will not resolve the issue. Dave Trueman reminded the group that the USBR uses the NEPA process to assist in making decisions. The intent was to find a temporary, inexpensive modification to the dam. The original options were costs of \$140,000,000 versus \$15,000,000, and the USBR decided to review the lower cost alternative. It is also reversible (the tubes can be pulled out). Money is being budgeted in FY2000 because future budget planning is necessary. After public comment has been received on the pros, cons and risks of temperature control, the USBR will decide whether or not to proceed. Dave Cohen stated that there are serious concerns about favorable and unfavorable aspects of the device, and suggested offsite testing. Dave Trueman stated that a

selective withdrawal temperature model exists at Flaming Gorge, and although it is different, the trout fishery has seen beneficial effects, and more diversity of native environment and positive effects to the native fish. Barry Gold stated that reports are due shortly on SWCA's draft data integration as well as fish data integration work from GCES Phase II (led by Duncan Patten). TWG may ask both of those groups to present and also suggest that Larry Crist present Flaming Gorge data at the March meeting.

Recommendation: Submit suggestions to Dave Trueman regarding any additional areas to be included in the EA. Dave Trueman will submit the pre-draft EA to the TWG for a 60-day review. It will also review the second draft. Bill Davis will prepare a paper outlining concerns and the interests expressing these concerns for review and reaction by the TWG. Larry Crist will be asked to present Flaming Gorge temperature control data at the next meeting.

GCD Issues Ad Hoc Group (45,000 cfs & BHBF): Tom Moody reported that the ad hoc group has not yet addressed the 45,000 cfs and fluctuating flows issues. Bruce Moore discussed operational criteria developed after the spillway repairs. The designers recommend 7,500 cfs to start a sweep then decrease to 6,000 cfs with gates open no less than one foot (to avoid cavitation problems). The designers are confident that the spillways can be utilized for a test with no limitation of magnitude and duration of the flows. We can run a test, using either a combined or singular tube, of an additional 15,000-25,000 cfs (a range of 60,000-75,000 cfs), with what we believe is no damage to the spillways. In Denver, a test was run of 48,000 cfs for 24 hours out of one tube. We would plan a similar flow for a 2-day test. Wayne Cook stated that it is better to use both spillways for tests because lower flows reduce potential damage. Water temperature during our tests needs to be taken into account to avoid thermal shock to fish (colder water is spilled from the bypass tubes and warmer water from the spillways). Wayne Cook stated there may be economic impacts from the increased amount of water. However, flows are run in high water years and the water would have spilled anyway. Once the economic issues are addressed the power interest would concur with these operations. Bruce Moore stated that flows above 45,000 cfs are not covered in the operation criteria. The criteria are very specific on 45,000 cfs and it may require changes by the Secretary, unless it is run as a test. NEPA will also need to be performed, and Tony Morton has not yet addressed the over 45,000 in his analysis. There are also policy issues with the ROD. This action would be difficult to run this year but would be possible next year. GCMRC requested specific parameters (i.e., including fluctuating flows and compared to what) in order to evaluate and develop a research plan containing multiple flow volumes and time frames. The 45,000 cfs evaluation on other resources will take some time. Gene Jencsok suggested that it be evaluated in 15,000 cfs increments (45,000-60,000 cfs; 60,000-75,000 cfs; 75,000-90,000 cfs.) Wayne Cook suggested the TWG recommend a flow above 45,000 cfs and a low flow average over 25,000 scenario to pass water past the high forecast inflows. The scenario would not be implemented if there is no hydrologic trigger. He cautioned that we need to be prepared if the trigger happens earlier than anticipated. Bill Davis stated that if the Center is evaluating a 60,000-80,000 cfs experimental flow, it may not be advisable to run a low flow following in the same year. The flows do not have to be packaged together. They can be reviewed and a decision made whether to run them concurrently or separately, considering associated deposition and erosion issues. It was suggested the ad hoc

group be utilized to provide specificity to these matters, and develop an outline including fluctuating flows, legal, policy, technical and resource issues. These should be explored and addressed at a logical pace and in a systematic manner.

Recommendation: The ad hoc group and a GCMRC representative will meet, prepare issue information and report to the TWG at its next meeting. GCMRC will receive specific parameters from the TWG and evaluate the resources in 15,000 cfs increments.

State of Natural and Cultural Resources Annual Report Outline Ad Hoc Group:

(Attachment 6) Tom Moody distributed a draft outline dated February 16, 1998, including most of the comments received. This is a separate and more technical report than the Annual Report to Congress. It is a management document which attempts to link changes in scientific understanding of natural and cultural resources into management decisions. To accomplish this, the information transfer has to be accurate and timely. It is an objective assessment of the present condition and future trend of the resources included in the management objectives. It will be a two-part document consisting of a short (approx. 10 pages) Executive Summary including mostly graphs indicating trends analyses. It will be current enough to enable the information to be included in budget cycles, RFP cycles, the AOP process, etc. The ad hoc group is proposing that resource areas which reflect change be updated on a quarterly basis. TWG requested baselines be included. The second document will include assessment theory of resource conditions and trends. The finals on both of these reports is scheduled for completion January 1, 1999.

Recommendation: The TWG should review this document again and make comments on what information is necessary or unnecessary. Submit comments to Larry Stevens by March 3, 1998. Comments will be incorporated and the reports brought to the next TWG meeting. The TWG recommended that it is more realistic to update the reports every 6 months rather than quarterly.

Public Comment: none.

Management Objectives Ad Hoc Group: (Attachment 7) Dave Garrett discussed establishment of management objectives for Lake Powell, which were discussed at length by the TWG. The group discussed effects of daily dam operations and whether they affect Lake Powell. TWG recommended four objectives: (1) continue the monitoring program; (2) continue assessment of chemical and biological data; (3) develop conceptual modeling; and (4) develop fish impact assessment. Negative feedback was expressed regarding the delay in finalization of the Lake Powell Assessment. Dave Garrett stated that revision of the large report and an Executive Summary which summarizes operations criteria effects to biological, chemical and physical aspects of reservoir resources will be completed shortly. Bill Davis felt that we are premature in defining management objectives for Lake Powell at this time. Also that appropriate process was not utilized in that a technical review should have been conducted by this group prior to the previous report being referred to the decision makers, and we now have that opportunity. Chris Harris stated that the TWG had not yet been created when the limnologists presented their data during the Information Group Meeting at which Bill Davis was not in

attendance. Bill Davis will be provided a copy of the report distributed at the August 26, 1996, Information Group Meeting until the revised report is distributed. Dave Garrett stated that a general summary of the findings from the spike flow was that long-term sustained high flows had significant impacts, and differing flow regimes sets the lake up differently (depending on antecedent conditions). These findings will be included in both the revised report and the Executive Summary. The data base, graphics and analysis that are used is extremely large, but the TWG may have access to it if the information GCMRC distributes is not enough. It was suggested that since a number of TWG members are familiar with the previous report information that we continue with development of general management objectives for Lake Powell. Although we need to assess effects of dam operations on the reservoir, Lake Powell objectives should not drive downstream operations. This group will be involved with preparation of a recommendation to AMWG. Dave Garrett reviewed vegetation and fish and aquatic management objectives, and TWG made minor revisions thereto. Objectives should be constrained by the ROD, and any that are not under the current operating procedures should be revised.

Recommendation: The revised Lake Powell Assessment report and Executive Summary will be forwarded as soon as possible to the TWG. It will also go out for external review and be posted on the GCMRC AMWG/TWG web site. If there is negative feedback with the fish impact assessment management objective, we will discuss it at the next TWG meeting. As management objectives are revised by the ad hoc group, they will be provided to the TWG for review and input. Agenda item for the March TWG meeting.

Public Comment: A question was asked about who originally developed the management objectives. The answer was that the Transition Work Group drafted them.

BHBF Issues Ad Hoc Group:

Hydrologic Forecasts: (Attachments 8, 8a) Randy Peterson distributed a general analysis of monthly releases surrounding the BHBF (requested at the last meeting), and a second document outlining current conditions. The basin continues to be dry (mid-60% level). The basin-wide snowpack is 90% of normal. He reviewed an overhead transparency of the 1997-1998 chart on forecasted GCD releases. The risk of releasing 20,000 cfs or greater through July is 5-10%. There is a significant chance of running a BHBF this year, but currently the chance is about 10%. The chance of running at full powerplant capacity is about 5-8%. There is a 2% risk of losing control of the inflows this year. 70% of El Nino years have wet springs. The NWS has been low on its forecast of inflows to Lake Powell for the past 7 months. The forecast takes this into account, but does not take into account the knowledge or information contained in the El Nino situation. Randy Peterson stated that releases will continue to be conservative (20,000 cfs) this year until the releasing of more water is justified. Our correct target storage should be realized by January, 1999. There will be a discussion at the March TWG meeting on El Nino analysis. Ted Melis is awaiting more ENSO data from Terry Cole.

Compliance Report: Tony Morton stated that they are on schedule for the Endangered Species

compliance activities. We have a preliminary biological assessment which Larry Stevens (GCMRC) is drafting. When it is complete, he will discuss it with Bill Persons, and perhaps NPS, and others within the TWG. Tony Morton also has a preliminary draft EA primarily based on the results of the 1996-1997 flows. We are awaiting for final development of the resource criteria which will serve as the basis for the impact analysis of the EA. We have preliminary hydropower analysis that Clayton Palmer has drafted. Regarding NHPA compliance, within two weeks the PA signatories will be provided a copy of the proposed action and the purpose of the need to the PA Signatories. ESA/NEPA/NHPA compliance is on schedule for a May/June/July event. If the event must be moved up, the main difficulty we will encounter will be the status of the biological resources criteria. If they exist and we have time to apply that criteria, we can make a decision based on that. If they have not yet been determined (say for April) and we don't know what the impacts will be, it is the same as a "no go." It was suggested to include April in the resource criteria. Tony Morton distributed a table (Attachment 11) which compares BHMF, BHBF and this spring's proposed flow. Tony Morton proposed this spring's proposed flow be called a "sediment conservation flow," since the BHBF's definition in the EIS is not consistent with the ROD, and the BHBF did not accomplish all that was intended except sediment deposition. The TWG made minor revisions to the BHBF hydrology. Barry Gold felt we do not need to create a new category and should not draw conclusions from one data point which is not fully supported and seems to suggest that not all of the objectives of the BHBF were attained. Part of the rationale is mitigation, but sediment conditions have changed since 1996 so scouring effects may change, and we still want to accomplish nutrient deposition (which is dropped out of the sediment conservation flow definition). Tom Moody stated that we can modify the flow and keep the objectives of the BHBF. A question was asked if this will be a broader scope programmatic EA which encompasses January-July. Barry Gold stated that GCMRC is working on closure on the effects matrix for May-July and may have difficulty getting it done. The resource criteria and the effects/impacts matrix exercise is our link and we are focusing on May-July so we can provide details. To include January-July is a much larger exercise. What we started on for January-July cannot be completed in a month, but can be completed over the remainder of the year and it will be ready for next year.

Recommendation: The name will not be changed to Sediment Conservation Flow. Revise the language in the BHBF definition to match the ROD.

KAS: The Biological Opinion calls for informal discussions with FWS for establishing another population of KAS before another BHBF. Tony Morton stated that establishment of a second population may not be necessary, but sufficient progress must be made towards reestablishment. Bob Winfree stated that at the last TWG meeting, Dennis Kubly had proposed a series of trips coordinated with NPS with FWS agreement. Bob Winfree feels that not enough coordination is taking place regarding the proposed sites amongst NPS, AGFD, FWS and GCMRC. In another forum several months ago when the AGFD report came out, NPS and FWS had identified a problem with management and protection of some of the proposed sites, depending on whether the populations were experimental or fully protected. A letter was sent to Dennis Kubly outlining their concerns about the locations. One of the optimal sites may jeopardize the principle water supply for the GCNP, and the water cannot be managed differently

because a population is introduced. The other site is a popular tourist destination. NPS feels the selected sites should be feasible for management and relatively remote. This would increase monitoring costs, but decrease disruption of the populations. At the last TWG meeting, GCMRC was unaware of the site controversy when it committed to provide logistics for monitoring and research for the establishment of the KAS populations. Last week, Dennis Kubly provided Barry Gold with additional detailed information regarding his trip requests and required support. The first trip is currently on the river reviewing ten potential sites. A meeting to discuss the site issue needs to occur before the next trip which will focus on three specific sites. Restocking of snails shall be done by NPS management actions, not by AGFD, because NPS is the management authority for that land. It was reported at the last TWG meeting that the EA compliance process was progressing. After investigation, Bob Winfree discovered there is currently no action taking place in writing the EA for stocking due to schedule conflicts of the responsible NPS person. This will delay the process several months. Tom Moody stated that there must be agreement on these sites with the FWS, and NPS needs to be in progress with its compliance. Bruce Moore stated that if FWS does not approve sufficient progress towards a second population, the BHBF is a no go. FWS needs to tell us if we have to have the snails actually in place before a BHBF or if it is acceptable that we are moving towards that goal. Reclamation will fund the second population effort out of appropriated funds and it will not be an issue of the AMP budget.

Recommendation: NPS will convene a meeting including Dennis Kubly, Johnny Ray, R.V. Ward, Debra Bills, a GCMRC representative and its logistics coordinator as soon as possible to discuss the site issue and stocking of KAS.

BHBF Science Plan Funding Ad Hoc Group: Bruce Moore reported that a decision had previously been made that we would explore other funding sources so that power revenue will not have to pay for the entire BHBF. If the flow is run, we will now have the funding for it. GCMRC will expend \$50,000 out of its budget, USBR will expend \$300,000, from the CRSP budget some reprioritization of work will provide \$300,000, and WAPA \$350,000. CRSP and WAPA are the same funds except that the reprioritization funds are currently in the budget, but the WAPA funds are new funds. There are no funds in the FY99 budget to run a spike flow should one be recommended. Should there be a trigger for a flow next year, we will go through the same funding procedure, but the costs for monitoring will be significantly less. If CRSP money is not expended in the same year, less money is requested the following year (it is an offset, not a carryover). Cliff Barrett stated that typically one year operation money is not carried over by WAPA. The USBR appropriated funds are available for use to run a flow until July 1, 1998. If the flow is not run, the funds will be utilized to fund other USBR activities. GCMRC's \$50,000 will be utilized for monitoring and research only after a decision is made to run the flow (preparatory work is not taken out of those funds). We do not yet have a science plan from the GCMRC. The effects matrix process needs to be further along in order to develop the science plan. At some point, Bruce Moore would like to discuss funding for a potential spike flow in the year 2000.

BHBF Resource Criteria and Flood Effects Matrix: Barry Gold reported that last week Barbara Ralston (GCMRC) met with the sediment, aquatic biology and terrestrial biology

scientists. They discussed hydrology. The focus is on resource criteria for May/June/July. If April is to be added, Randy Peterson will need to give GCMRC some guidance. They reviewed the matrix exercise and developed a +3/-3 ranking scheme which they are not comfortable with

but will be used to refine their values:

<u>Rank</u>	<u>Definition</u>
+3:	activity will immediately negatively affect the resource and after a year little recovery to that negative effect is likely (gray zone effect; may be large enough to bring it to the attention of the managers)
-2:	will or may negatively affect the resource but recovery is expected within a year (gray zone effect; may be large enough to bring it to the attention of the managers)
-1, 0, +1, +2, +3:	may affect but hard to know given the current state of information; no reason to think you should not do something

A narrative is being developed for each resource for each month which shows the resource in its various life stages and what the effect is. TWG requested clarification about if the ranks are looking at absolute or comparative effects regarding powerplant releases, what we are evaluating and the difference in the rankings. It will evaluate the effect of the spike flood and not the following flows. It will be important to the managers for decision making purposes for their resources. The matrix will be changed to a narrative rather than the numbered rankings, and is should be completed by the end of March. The ad hoc group is attempting to get the criteria developed to use this May, and also getting process together to use in the future. If there is a may affect or no effect, resource criteria do not need to be considered. When there is a -1 or greater, the criteria need to be stepped through. The resource criteria will need to be renewed each year, depending on the effect to the resources each year. The TWG should be responsible for criteria on acceptable levels of resource impacts. The GCMRC should determine the level of impacts occurring during a spike flow as well as determine the effects of frequency of spike flows on the resources. TWG requested the Center to bring back a sediment related trigger based on the sediment metric.

Recommendation: The narrative will be distributed to the resource people first. The matrix will be distributed to the TWG and discussed at the next meeting. Bob Winfree, Barry Gold and Barbara Ralston will meet regarding the effects language for the narrative. Barry Gold will check on the status of the sediment metric.

November 1997 High Flow Update:

Sediment: (Attachment 9) Ted Melis presented sediment results received from USGS (Boulder, Colorado and Tucson, Arizona). Taking into account that this was only a two-day flow, the system-wide pattern was consistent with results we saw with the first 3-4 days of the 1996 45,000 cfs constant flow. The sediment concentration declined at the same time the particle size distribution and the suspended load increased. It appeared to follow the same hysteresis or grain size evolution that we saw in 1996, in that the sediment concentrations from

beginning to end were all higher at each site sampled than they were in 1996, even at the LCR site. Above the LCR confluence the suspended sediment concentrations were basically equivalent to what they were at the Grand Canyon gage, which was not the case in 1996 (when they were more elevated below the LCR confluence as compared to above). So the sediment inputs from the Paria last summer were very significant. It appears that Marble Canyon was reloaded with a much larger amount of fine sediments probably for the first time since 1983. The grain size changed in the beds in the course of two days, which shows that we were able to bank available sediment along the shorelines and simultaneously reduce downstream transport by coarsening the beds all within 48 hours. We were unable to determine where the sediment ended up in the system due to the test being conducted during a non-motorized season and full or partial bathymetry could not be conducted.

Impact to Power Revenue: Clayton Palmer reported that WAPA is currently working on a model for determining the costs and are now calibrating it. They have determined estimated costs for the proposed BHBF this spring and will provide the results to Reclamation this week. They have not yet estimated costs for the November 1997 high flows. Costs to power users are approximately \$1,000,000. Reclamation will need to assess other impacts such as recreation. Cliff Barrett stated that now the ROD has been signed, they will not get compensated for BHBFs (should there be a test flow they would receive compensation). This was not Reclamation's understanding. WAPA can use Flaming Gorge and the Aspinall units to make up differences in shortages at Glen Canyon. In April, power purchasers will enter into a contract whereby they pay for replacement costs directly. It will not go into the basin fund as it has in the past. This will reduce the overall costs of replacement power.

Recommendation: Estimated costs of the November 1997 flows will be presented at the next TWG meeting. Bruce Moore will discuss with Cliff Barrett the issue of compensation.

Science Advisory Board: (Attachment 10) Barry Gold distributed a discussion paper that was revised by the Ad hoc group on February 16, 1998. He then reviewed a number of issues covered in the paper.

1. Does the SAB duplicate other review mechanisms? In the paper the Ad hoc group has carefully constructed the SAB so it does not duplicate NRC & TWG responsibilities. The Ad hoc group also agreed to review both NRC & SAB activities in the future to ensure that there is not duplication of effort.
2. Process for selecting members. The recommended procedure attempts to balance the desired independence of the SAB with acceptance of the advice provided by the stakeholders. Selection will be done using an independent peer review process with the applications evaluated on explicit review criteria approved by the AMWG. AMWG may also wish to recommend people to whom the RFP should be sent.
3. Reporting: Some concerns were raised during the drafting of the discussion paper about the role of the TWG in reviewing the advice of the SAB. Discussion paper contains language which

indicates the advice is provided in writing directly to the AMWG, GCMRC, or the Secretary, as appropriate. Copies will be provided to TWG at the same time.

4. Establishment and FACA compliance. Asked Scott Loveless for advice. Will need to address this at our next meeting.

Recommendation: Following review and discussion with the TWG, Ad hoc group was advised to revise the paper and bring a new document to the March 16-17 TWG meeting.

Programmatic Agreement/Cultural Resources Budget: (Refer to page 2, Item III-B of Budget Attachment 3) The TWG had previously requested additional information be provided. Signa Larralde reviewed the programmatic agreement budget. She stated that the PA meetings are a compliance activity, are held quarterly and are open for anyone to attend. NPS, USBR, five tribal representatives, Arizona Historic Preservation and WAPA attend the meetings. NPS and USBR determine what the requirements are to meet the law. Funding is from power revenues (even if the PA were removed from GCMRC's work). The NPS expends approximately \$50,000 of its funds in salaries related to this work. The program includes monitoring and remedial actions related to dam operations. They are trying to shift from monitoring to remedial action. The NPS, GCNP, GCNRA, and tribes all conduct monitoring of cultural resources on their respective lands. 336 significant sites have been identified. Data recovery is performed where an eroding site cannot be saved through stabilization. The area is divided into two different sections related to GCNRA and GCNP. NPS provides work on monitoring and associated reports. Another cost is USBR administration of the program. The tribes provide work including monitoring traditional cultural sites, remediation, education, etc. The funding breakdown is not equal amongst the tribes and some of them provide work in cooperation with other programs. Tribes submit annual reports and the next year work plans on August 1. The program scope is usually consistent from one year to the next, but there is a remedial action for FY2000 which will increase the budget significantly. Signa Larralde was asked if the yearly work plans can be submitted earlier in order to include it in the AMP budget cycle. Signa stated that they had discussed it but have not yet made changes in the report schedule. The PA schedule was in existence prior to GCMRC's schedule. However, Signa thought they would be responsive to the request to coincide with the GCMRC's schedule, but stressed that the reports will be less accurate because it is based on results of river trips in a fiscal year schedule. If some tribes have not taken their river trip yet, they would have to estimate their findings. It was suggested that monitoring and remediation be broken out as separate line items. USBR should prepare a monitoring schedule with costs. Clayton Palmer would like to focus on the FY2000 budget and see a modification to the schedule for that fiscal year. The cap on the program is approximately \$800,000, and that limit is known for several years in advance. Clarification was requested on Section 110 and Section 106 (NPS & USBR). Section 106 is linked specifically with a cultural resources project or activity. NPS is involved because they the land management agency. Section 110 deals with their responsibility for long term management of their resources.

Recommendation: Kurt Dongoske and Mike Yeatts will present the integration paper between the PA and GCMRC at the next TWG meeting.

Action Items/Deadlines/Future Agenda Items:

Meeting times and locations: Bob Winfree has been receiving items or inclusion on the agenda late, and requested they be submitted sooner. Meeting sites and dates can be found on the GCMRC AMWG/TWG web site. Ad hoc groups should provide meeting times and dates to Serena for posting on the web site. Barry Gold stated that he would like to arrange field trips for TWG to Glen Canyon Dam and the Lees Ferry Reach on Sunday, May 17.

Recommendation: TWG members should contact Barry Gold to inform him of their interest in participating in the field trips.

Action Items: The Chairperson reviewed action items identified at this meeting:

- All Ad Hoc groups will report at each meeting of the TWG. 15 minutes will be provided on the agenda.
- GCD Issues group will develop a summary report for the March meeting.
- State of the Resources group will revise outline and redistribute for March meeting. (TWG members provide comments to Larry Stevens)
- First Draft TCD EA expected by Reclamation in 12/98
- NPS convene meeting of AGFD NPS, FWS, BOR on sites for second population of KAS.
- SAB revise paper. Address differences in the EIS.
- Prepare an out year framework and procedures for the Budget. (Budget group, Garrett)
- Winfree Gold, Ralston meet in Flagstaff on resource criteria
- Collect comments and prepare draft position paper on gate extensions.

Agenda Items:

Every meeting will include:

- Hydrologic forecasts
- Ad hoc Group Status Reports

March 17-18: 9:30am-5pm; 8am-4pm - LaQuinta - Phoenix:

- Federal /Tribal relationships(Rebecca Tsosie)
- PA/GCMRC integration Report (Yeatts/Dongoske)
- El Nino correlation
- GCD release list (Clayton Palmer/Randy Peterson)
- Gate Extension

April 7-8: 9:30am-5pm; 8am-4pm - ADWR - Phoenix:

- Fish Data Integration Panel Report (SWCA) (possibly will be on March Agenda)
- GCES Phase II Data Integration (Patten, Minckley) (possibly will be on March Agenda)
- What we learned from Flaming Gorge (Larry Crist) (possibly will be on March Agenda)
- Resource effects matrix (GCMRC)
- FY2000 budget final deliberation

- BHBF compliance
- Review Lake Powell reports (GCMRC)

May 18-19: 12:00 pm-5:00pm; 8:00am-12:00pm - USGS Flagstaff Field Center - Flagstaff:
Joint/overlap meeting with conceptual modeling work shop. Workshop May 20-22. Morning of the 20th would be dedicated to the TWG input. They are building submodels and frame works.

June 9-10: 9:30am-5pm; 8am-4pm meet at ADWR - Phoenix:

- Finalize documents for AMWG.
- Conceptual Model presentation.

July 23, 1998: 8:00am to 4:00pm- Embassy Suites (44th & McDowell Roads) - Phoenix:
One day TWG meeting following the AMWG meeting on July 21-22, 1998

Public Comment: The Chairperson asked for public comment at the end of each major topic.

There being no further business, the Chairperson adjourned the meeting.

Respectfully submitted,

Serena Mankiller, GCMRC Secretary

Key to Acronyms

ADWR - Arizona Department of Water Resources
AGFD - Arizona Game & Fish Department
AMWG - Adaptive Management Work Group
AOP - Annual Operating Plan
BHBF - Beach/Habitat-Building Flow
BHTF - Beach/Habitat Test Flow
BIA - Bureau of Indian Affairs
BOR - Bureau of Reclamation
CAPA - Central Arizona Project Assn.
CRBC - Colorado River Board of California
CRCN - Colorado River Commission of Nevada
CREDA - Colorado River Energy Distributors Assn.
CRSP - Colorado River Storage Project
CWCB - Colorado Water Conservation Board
DOI - Department of the Interior
EA - Environmental Assessment
EIS - Environmental Impact Statement
ESA - Endangered Species Act
FACA - Federal Advisory Committee Act
FWS - United States Fish & Wildlife Service
FY - Fiscal Year
GCD - Glen Canyon Dam
GCMRC - Grand Canyon Monitoring and Research Center
GCNRA - Glen Canyon National Recreation Area
GCPA - Grand Canyon Protection Act
HBC - Humpback Chub (endangered native fish)
IEDA - Irrigation and Electrical Districts Association of Arizona
KAS - Kanab Ambersnail (endangered native snail)
KAWG - Kanab Ambersnail Work Group
LCR - Little Colorado River
MAF - Million Acre Feet
NAU - Northern Arizona University (Flagstaff, AZ)
NEPA - National Environmental Policy Act
NHPA - National Historical Preservation Act
NPS - National Park Service
PA - Programmatic Agreement
Reclamation - United States Bureau of Reclamation
RFP - Request For Proposal
RPA - Reasonable and Prudent Alternative
SAB - Science Advisory Board
TCP - Traditional Cultural Property
TES - Threatened and Endangered Species
TWG - Technical Work Group (Glen Canyon)
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