

**Minutes of Technical Work Group Meeting  
January 20-21, 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  
Christopher Harris, ADWR  
Norm Henderson, GCNRA  
Amy Heuslein, BIA  
Pamela Hyde, American Rivers

Gene Jencsok, CWCB  
Robert King, UDWR  
Phillip S. Lehr, CRCN  
Carlos Mayo, Southern Paiute Consortium  
Bruce Moore, USBR  
Clayton Palmer, WAPA  
Bill Persons, AGFD  
Andre Potochnik, Grand Canyon River Guides  
John Shields, Wyoming State Engineer's  
Office Fred Worthley, CRBC

**Committee Members Absent:**

Mark T. Anderson, USGS  
Joe Dishta, Pueblo of Zuni  
Kurt Dongoske, The Hopi Tribe

Alan Downer, Navajo Nation  
Owen Gorman, USFWS  
Tom Moody, Grand Canyon Trust

**Alternates Present:**

Michael Yeatts, The Hopi Tribe  
Debra Bills, USFWS

**Alternate For:**

Kurt Dongoske, The Hopi Tribe  
Owen Gorman, USFWS

**Other Interested Persons Present:**

L. David Garrett, GCMRC  
Barry Gold, GCMRC  
Dennis Kubly, AGFD  
Steven Lloyd, USBR  
Robert S. Lynch, Esq. (CAPA/CREDA/IEDA)  
Ted Melis, GCMRC

Tony Morton, USBR  
Randy Peterson, USBR  
Mark Phillips, Trout Unlimited  
Barbara Ralston, GCMRC  
Larry Sibala, BIA  
Jeff Sorenson, AGFD

**Recorder:** Serena Mankiller, GCMRC

**1/20/98: Convened:** 9:33 a.m. **Adjourned:** 4:35 p.m.

**1/21/98: Convened:** 8:10 a.m. **Adjourned:** 3:49 p.m.

**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 for January 20 with no revisions. Additions were made to the January 21 agenda.

**Attendance Sheet:** Official members or their alternates are to sign in on the yellow sheet; all other attendees are to sign in on the white sheet.

## **ADMINISTRATIVE ITEMS**

**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.

**Federal Register Notice:** Meetings are being noticed as required.

### **Alternate Meeting Location & Schedule:**

**Location:** Steve Lloyd reported that Chris Harris has arranged for TWG to utilize ADWR meeting rooms located at 500 N. 3<sup>rd</sup> St., Phoenix, Arizona (602) 417-2400 x7264 for TWG meetings after March, 1998. Meetings will be held at the La Quinta Hotel location through February, 1998, as officially noticed. Ad hoc groups may schedule meetings at ADWR with advance notice to Chris Harris. Positive feedback due to no charge for meetings rooms, audio/visual equipment availability, proximity to airport, hotels, and limited free parking. Chris Harris can provide a shuttle service to and from the airport. Directions and other information will be posted on the GCMRC AMWG/TWG web site.

*Recommendation:* Group recommended that we utilize ADWR's location for meetings after 3/98.

**Schedule:** TWG reviewed its 1998 meeting schedule, and scheduled additional meetings through June 1998. For all meetings, Day 1 hours are 9:30 a.m. to 5 p.m. Day 2 hours are 8 a.m. to 4 p.m. (or end of business). Information will be posted on the web site. Future agenda items for February and March was revised.

February 17-18, La Quinta Hotel, 2510 W. Greenway Rd., Phoenix, AZ

March 17-18, La Quinta Hotel, 2510 W. Greenway Rd., Phoenix, AZ

April 7-8, ADWR Conf Room A, 500 N. 3rd St., Phoenix, AZ

May 19-20, location to be announced

June 9-10, ADWR Conf Room A, 500 N. 3rd St., Phoenix, AZ

*Recommendation:* USBR will cause the new meetings to be noticed in the Federal Register.

**GCMRC Integration Project/Conceptual Modeling:** Barry Gold reported that GCMRC held a Conceptual Modeling Scoping Workshop January 13-14, 1998 in Flagstaff. The workshop covered design issues in building conceptual modeling and working on organizational structure. A second workshop is scheduled for May 21-23, 1998. The modeling team has requesting a

limited number of TWG members involved in research to give input to the model during a half-day session of the TWG meeting on May 21. TWG interaction on management objectives and information needs is vital. It will give members of this group an introduction to conceptual modeling and an opportunity to bring forth concerns that you want added to or taken out of the model. The team took GCMRC data to start development of the framework. A self-contained meeting location outside of Flagstaff is desired so that full involvement of the GCMRC staff can be accomplished. Dave Garrett stated that it is advisable to involve TWG researchers before developing a systems modeling for the Lake Powell work. Bob Winfree stated that some TWG members may be attending the Geological Society of America meeting scheduled during that time frame.

*Recommendation:* Proposal for co-location of the meetings was approved. The meeting with TWG researchers and modeling team will begin at noon on May 21.

**Ad Hoc Groups:** The Chairperson suggested that ad hoc groups schedule some of their meetings around the TWG meeting, since so many members are present.

**Roles and Integration Report:** (Attachment 2) Chris Harris distributed "Roles, Responsibilities, Schedules and Process Integration" information for the AMWG and TWG dated January 1998. Review for accuracy from your entity's perspective and determine if you concur with Chris Harris' interpretations. Submit revisions to Chris Harris. GCMRC will review the package with Chris Harris and the USBR and include the documents in its annual update of the TWG Briefing Booklet, which will be redistributed to TWG in March or April 1998.

*Recommendation:* After TWG receives the updated booklet, it should form an ad hoc group to work on merging the schedules and budgets. The schedule will be updated annually. GCMRC will plan to make the information available on its web site after completion of the schedule.

**Selective Withdrawal Environmental Compliance:** Tony Morton reported that Dave Trueman (USBR) gave a presentation at the January 15-16, 1998, AMWG meeting. The test facility is currently being designed. Investigation of the structure is required by the Biological Opinion. Reclamation will take the lead on temperature modeling for the river. Alan Haden (under Dean Blinn) at NAU has completed a productivity assessment on the benthic community. A final report was received 2-3 months ago and is in the GCMRC Library. SWCA is doing work on data integration and evaluation of possible effects, which some TWG members thought was a formal risk assessment (it is not). Dave Garrett asked if the GCMRC will need to provide science assistance prior to implementation of the 2002 testing.

**Draft Temperature Control Environmental Assessment.** The purpose of the EA is two-fold: to evaluate construction, installation and also potential operation of a test selective withdrawal structure. The actual testing will determine operational and long-term impacts. The EA will also include alternatives for operation and alternate methods of warming water other than selective

level control structures. Dave Trueman will develop a draft EA. Tony Morton will assist him. Several members felt it would be difficult to separate operation from the construction.

The NEPA process will help determine final structure design. The process has two objectives: (1) A NEPA assessment of construction of the project and potential impacts, and (2) an assessment of the impacts of operations of the facility once in place.

EA development will begin in summer, 1998 and be completed by December 1998. A FONSI would target construction to be complete in early 1999.

Test Facility Structure Construction & Budget. The current budget is \$400,000 per year through FY1999. Appropriated CRSP Section 8 funds will be utilized until construction is completed. They will be permanent structures. Future Budget: if we decide to continue construction, it will begin in FY2000. Total funding is \$15,000,000. Funding to modify 4 penstocks (which is preferable to complete at first to determine functionality) is \$10,000,000 in FY2000. To complete in FY2001 funding is \$5,000,000. Once it goes into an operational mode, the budget for monitoring of operations impacts will become an Adaptive Management Program cost.

Testing is to start in 2002. Testing will determine operational and long-term impacts. GCMRC is to provide assistance in monitoring operational impacts.

An EIS will be completed after the testing period and determination of long-term impacts.

*Recommendation:* USBR is to develop a brief conceptual document defining the content and timetable of the EA which will cover construction and operation processes, but will not cover long-term operational impacts. The draft EA will be distributed within the TWG and other appropriate persons outside of this group. GCMRC will work with TWG to re-draft the five-year strategic plan to incorporate the selective withdrawal program (according to the resource needs for the operations).

**January-June 1998 Beach/Habitat-Building Flow Impact Effects Matrix:** (Attachments 3a-d) Barbara Ralston reviewed combined results of two matrix questionnaires returned from researchers. The second matrix did not change significantly from the first. All endangered species and fishing resources scored negatively in all months. It will benefit aquatic food base and physical resources. Diamond Creek and below will sustain negative impacts. Feedback indicated that researchers need to know the post-flood flows to better estimate the resource impacts. Randy Peterson suggested that they evaluate a general low/average/high hydrological scenario. Problem identified that all resources are weighted equally which will make the results look flat across the months. TWG needs to decide the purpose of the flow and prioritize resources to be monitored beyond water storage/delivery and sediment movement. When making decisions regarding flood planning, the timing of releases to coincide with tributary inflows needs to be taken into consideration. Scientists would like to evaluate a larger flow such

as 55,000 cfs. A 45,000 cfs flow will not reset successional clocks or scour backwater environments. The BHBF accomplished the EIS goals of achieving sediment resources and recovery times without harm to biological resources. The matrix will provide information to complete compliance and help TWG to develop the resource criteria trigger. Debra Bills stated that the Biological Assessment will be based on the data available through 12/31. Dave Garrett distributed a hydrograph for 45,000 cfs Releases (Attachment 3e).

*Recommendation:* Ad hoc group formed to meet to prioritize management objectives. First meeting to be January 28, 1998. Dave Garrett to facilitate. GCMRC to convene a meeting in February of researchers and better define the -3/+3 rating in the matrix and effectively summarize resource impacts. Debra Bills needs the information by the end of February.

**Hydrologic Forecast:** Randy Peterson gave his monthly update including snowpack, forecast, hourly dam releases and public notification issues. Basin-wide snowpack is 90% of normal. He discussed daily operation and associated impacts. There is less than a 5% chance that the hydrologic criteria for a BHBF will be triggered prior to May 1, 1998. Resources must be in a position that we can react to.

Four people are investigating historic El Niño correlation, and should have information available March 1, 1998.

Dave Cohen reported that the changes to flows during January 10, 1998, weekend stranded 300 young-of-year trout and desiccated Redds. Committee discussed concerns about impacts to various resources of fluctuating flows occurring at critical times. Definition of the term "trigger" was requested. It means that compliance has been met and minimal harm will occur to resources.

Committee requested an e-mail and web site notification procedure be implemented to advise researchers and guides in advance about minimum, average and maximum daily flows and anticipated fluctuations. A two-week advance notice is acceptable. Notification of exceptions or emergency operations was also requested, and when known, will be sent out in advance or as an ex-post notification of an emergency event as soon as possible. A new notification list should be developed which incorporates the old list, TWG committee members, fishing guides, etc. It is to be distributed weekly (every Friday afternoon) predicting flows for the weekend and the upcoming week.

*Recommendation:* Randy Peterson and Clayton Palmer to develop a dam release notification system, update the list, and report back at the next TWG meeting. TWG to contact Randy or Clayton with other persons or organizations to include on the list.

**Preliminary Results of November 1997 31,200 cfs Test Flow:** (Attachment 4a)

**Summary of Researcher Findings:** Dave Garrett summarized reports by Mark Anderson, Larry Stevens (GCMRC) and Joe Hazel (NAU) presented at AMWG at its January meeting. The

researchers focused on the recent large sediment input from the Paria and its changes in the system. The scientists feel that the data is valid, but the hypotheses still need to be tested. The scientists' previous assumption that high sustained flows (from 25,000-27,000 cfs) would move sand quickly out of the system may not be valid. The sediment stays in the system longer during higher flows than previously thought. Also, speed of deterioration of beaches may be similar to impacts from long term lower flows (5%-7% per year). NAU monitored 35 beaches. None were inundated, sand was put up on the margins above 25,000 cfs with a increase in volume of beaches of 3% (from 87% to 91%) which is a positive result, but not extensive. Subsurface monitoring of eddy bar deposits was not done because it was during the non-motorized season and the bathymetry rig could not be utilized. Subsurface data will be collected during upcoming monitoring trips. The 31,200 cfs flow did not generate enough energy to make a substantial difference in sediment conservation. The sediment resource from the Paria remained there. It did not clean out backwaters. A later 45,000 cfs could preserve more sediment. It is not recommended to run another 31,200 cfs flow in the future for sediment preservation purposes. Minor impact to Flannelmouth Sucker; no impact to Southwestern Willow Flycatcher. It expended non-recoverable powerplant revenues. The Paria puts much needed fine sediment into the system, and future work will be focused on retaining those fines in the system.

Detailed Presentation on Preliminary Data and Results: Ted Melis discussed sedimentology and antecedent conditions (1990 to test flow) associated with the 31,200 flow (Attachment 4b). Fine sediment is more valuable to the ecosystem and tends to hold together sand bars. Clay is harder to transport than sand and does not tend to settle out, but attaches to larger particles. Little data has been processed so far on the sand/silt/clay transport. Ted discussed historical climatology associated with sediment inputs. Tropical cyclones tend to occur on a decade scale and trigger large sediment inputs. He is working with David Topping (USGS) to evaluate historical storm patterns that might correlate with Paria events. Ted Melis distributed an informational Colorado River climatology management article (Attachment 4c).

*Recommendation:* WAPA will produce a power revenue loss cost analysis and bring it to the February TWG meeting. GCMRC will analyze incoming reports and develop a full report in the spring of 1998 on the experimental flood, which will include long-term sustained flow information, sediment retention and loss of sand in the system, bathymetry results and analysis of Lees Ferry reach. It will be a useful tool for making management decisions.

#### **REVIEW OF AMWG RESPONSE TO TWG PRESENTATION**

Robert Winfree gave a status report on TWG activities to the AMWG at its January 15, 1998, meeting. Recommendations from AMWG are as follows:

TWG Formation and Operating Procedures: Accepted subject to legal and typographic review.

Advance Materials Mailing to AMWG 30/60 days: 30-day mailing accepted. Time-sensitive

information to be distributed immediately.

TWG Meeting Attendance Payment: Reclamation approved to provide up to \$20,000 funding for FY98. Charlie Calhoun (USBR) said that anyone with meeting attendance expenses from 10/97 through 1/98 submit them to Steve Lloyd as soon as possible. AMWG minutes need to reflect that for 1999 and future years, DOI agencies need to decide how to share costs so people who have trust responsibilities are invited. It has been covered out of appropriated funds.

Management Objectives and Information Needs: Accepted for FY98 and FY99 and current Strategic Plan. TWG to revise and prioritize for FY2000 plan and report back to AMWG at its July 21-22, 1998, meeting.

Science Advisory Board: Approved for TWG to develop an approach which incorporates GCDEIS criteria and GCMRC advisory needs. TWG is to work with GCMRC to establish the board which will advise GCMRC and report to AMWG.

Out Year Budget Review: AMWG approved TWG to review budget requests and advise AMWG of funding needs and opportunities to control future costs. USBR and GCMRC are to work on FY98, FY99 and FY2000 budgets and include detail regarding overhead costs.

Spillway Gate Extensions: TWG to review the issue and report back to AMWG.

Glen Canyon Dam Issues - BHBF Releases above 45,000 cfs and Daily Fluctuations: TWG to review issues and report back to AMWG.

NEPA/ESA Ad Hoc Group Report and Recommendations for Expediting Environmental Compliance: Accepted without voting.

BHBF Hydrologic Trigger Criteria: AMWG charged TWG to develop resource-based criteria as soon as possible.

Potential BHBF Spring 1998: AMWG charged TWG to develop a resource trigger, compliance and budget.

Dave Garrett distributed information developed by Larry Stevens: GCMRC Contingency Monitoring Program of Anticipated and Unanticipated High Flows from Glen Canyon Dam (Attachment 5d). It includes three objectives: (1) BHBF planned release; (2) Unplanned releases; (3) Research plan for understanding high flows.

Annual Report FY97-98/State of Resources Report: Accepted.

Monitoring and Research Plan FY99: AMWG accepted the plan. Greater detail on FY98 and

FY99 budgets is to be provided to TWG and AMWG.

TWG Meeting Minutes: AMWG accepted TWG minutes from the October 2-3, 1998, and November 4-5, 1998, meetings.

**NEW ASSIGNMENTS FROM AMWG JANUARY 15-16, 1998:**

TWG is to develop action lists, schedule activities and form ad hoc groups for the following assignments from AMWG (listed in order of priority). TWG is to take action and report back at AMWG's July 21-22, 1998, meeting on items 1-5. Ad hoc group membership and purpose will be posted on GCMRC's AMWG/TWG web site. Chairpersons/facilitators are to contact the GCMRC Secretary with their group's meeting schedule for posting on the web site as soon as possible so that less costly airline reservations may be made in advance. Ad hoc groups are open to additional volunteers at any time. Chairpersons will give a brief status report at each TWG meeting until the work is completed and ad hoc group is dissolved.

1. BHBF/Resource-based Criteria Ad Hoc Group

*Purpose*: to work on research and budget associated with a planned spring 1998 BHBF. It will develop resource-based criteria for a BHBF with the first priority being TES. A resource design was given to AMWG but we are not sure how much research funding we will get. AMWG will work with TWG to strategize on it.

*Volunteers*: R. Winfree (Chairperson), T. Moody, B. Gold, B. Ralston, C. Barrett, B. Davis, W. Cook, G. Jencsok, M. Yeatts, C. Mayo, P. Hyde, D. Cohen, Steve Lloyd, a FWS representative.

*Recommendation*: Research design guidelines for the Center should include post-flow scenarios and resource prioritization. USBR, WAPA and GCMRC will determine funding availability. When the budget is set, TWG will decide on which items (if any) will be cut.

2. BHBF Compliance Activities Schedule: Chairperson distributed General Planning Guidelines for BHBF (Attachment 5a dated 1/16/98). TWG reviewed and revised #7. TWG reviewed and made minor revisions to BHBF Compliance Timetable for Spring 1998 BHBF (Attachment 5b dated 1/16/98; Attachment 5c dated 1/21/98).

*Recommendation*: TWG to review for accuracy and submit concerns or differing interpretations to the Chairperson, GCMRC Secretary or Steve Lloyd. TWG to forward the Compliance Timetable to their AMWG representative. T. Morton will report at the next TWG meeting.

3. Science Advisory Board Ad Hoc Group: (Attachment 6)

*Purpose*: Work with TWG to design and establish a board (as required in the GCDEIS) which will report to AMWG. Gene Jencsok provided comments on the white paper to Barry Gold.

*Volunteers*: Barry Gold (Chairperson), B. Persons, K. Christensen, D. Cohen, W. Davis, K. Dongoske or A. Heuslein, G. Jencsok, USBR Representative

Meeting Schedule: 1/21 (lunch meeting); 2/10 time tba, GCMRC office, Flagstaff, AZ.

*Recommendation:* Submit any comments to Barry Gold. Report back to TWG on 2/17.

4. Management Objectives/Out Year Budget Ad Hoc Group:

Purpose: Review and update management objectives and information needs. Establish relative priorities by study type, resource class and by research/monitoring question. Review GCMRC outyear budgets, including detail regarding overhead rates. Timeframe: February/March.

GCMRC's former Program Planning Group was dissolved at this time and the new ad hoc group will take over its meeting rooms and times. Management Objectives need to be completed within 3 months of the AMWG. They are not permanent and will be reviewed and updated annually. Some members felt the budget could be worked on before the objectives and information needs are updated. The science group needs to have the management objectives and information needs first in order to do the budget. USBR needs the budget by March so discussions need to begin and a budget process structure established.

Volunteers: D. Garrett (Facilitator), C. Barrett, W. Davis, W. Cook, N. Henderson, K. Dongoske, B. Persons, C. Palmer, B. Moore, A. Heuslein, T. Moody, P. Hyde, D. Cohen, A. Potochnik, R. Winfree, G. Jencsok, M. Phillips, S. Lloyd, L. Stevens.

Meeting Schedule: 1/28 9:30 a.m.-5 p.m. at La Quinta in Phoenix, AZ; 2/24 9:30 a.m.-5 p.m. at ADWR Conf. Room A, Phoenix, AZ; 2/25 8 a.m.-4 p.m. at ADWR Conf. Room B, Phoenix, AZ; 3/17 or 3/18 time tba on TWG agenda, at La Quinta, Phoenix, AZ; 3/24 9:30 a.m.-5 p.m. at ADWR Conf. Room A, Phoenix, AZ.

*Recommendation:* Report back to TWG on 2/18.

5. Out Year Budget Ad Hoc Group: An ad hoc group was formed and combined with the Management Objectives Ad Hoc Group (priority #4 above).

6. Spillway Gate Extensions Ad Hoc Group:

Purpose: Review the ROD to install the gates permanently based upon new data on operations.

Volunteers: B. Moore (Chairperson), W. Cook, N. Henderson, P. Hyde.

Meeting Schedule: none reported.

*Recommendation:* Wayne Cook and USBR will develop a report for AMWG which includes more detail on compliance. Report back to TWG on 2/17.

7. Glen Canyon Dam Release Issues Ad Hoc Group:

Purpose: To gather information on flows above 45,000 cfs and daily fluctuations.

Volunteers: T. Moody (Chairperson), T. Melis, W. Cook, C. Barrett, C. Harris, R. Peterson, F. Worthley, M. Yeatts, C. Palmer, D. Cohen, A. Potochnik

Meeting Schedule: 2/18 at TWG meeting, La Quinta, Phoenix, AZ.

*Recommendation:* Resource Criteria will be discussed at each TWG meeting. Report back to TWG on 2/18.

8. State of Resources Report Ad Hoc Group:

Purpose: Review and recommend format for annual report for TWG and AMWG review.

Volunteers: T. Moody (Chairperson), L. Stevens

Meeting Schedule: tba

*Recommendation:* Report back to TWG on 2/17.

The TWG also formed a BHBF Science Funding Ad Hoc Group:

Purpose: Design research and investigate funding alternatives for a potential 1998 spring flood.

Volunteers: Bruce Moore (Chairperson), C. Barrett, D. Garrett, W. Cook, C. Palmer.

Meeting Schedule: via conference calls

*Recommendation:* Dave Garrett will provide more detail on research and procedures to be done.

The TWG also formed a BHBF Compliance Issues Ad Hoc Group:

Purpose: Investigate compliance activities and timetables for a spring 1998 BHBF.

Volunteers: Tony Morton (Chairperson), Debra Bills (FWS)

Meeting Schedule: (status reports at TWG meetings)

**BHBF/Resource-based Criteria:** Debra Bills stated that the BHBF Science Plan Ad Hoc Group (which met briefly during the AMWG meeting last week) had discussed budget only, and not the possibility of a BHBF prior to May 1 (as Randy Peterson has reported). If one occurs in April she will work toward meeting compliance for that flow. We have a 30-day window to make a decision again once a hydrological forecast comes out. If that triggers the decision to evaluate a flow, we have 30 days in which there is a new forecast to re-evaluate a trigger. If a trigger occurs before May and compliance is unable to occur, releases would go to 25,000 cfs (or whatever release is required), and wait until NEPA compliance is met to do a test. We would lose the opportunity for a BHBF and sediment is sacrificed. The compliance process should begin as soon as possible. The schedule and a trigger will operate independently of each other. If a hydrological trigger is reached, USBR is notified, the GCMRC does a resource evaluation based on criteria that TWG provides, TWG reports to Secretary's Designee. Clarification was requested about flow scenarios if hydrological trigger occurs in two consecutive months. A 45,000 cfs flow would be run in month one, followed by high powerplant releases. 45,000 cfs flows would not be run in two consecutive months. Large flows and flood ponding trigger spawning by some species, but also distributes seeds from exotic vegetation. The group needs to know what percentages of sediment are moved to the channel margins and how much is transported out of the system. A BHBF is always beneficial before going to high sustained

flows. Resources with legal mandates are the first level of priority followed by ecosystem considerations. An email was received during the TWG meeting from Margaret Matter of WAPA (Attachment 7) expressing resource concerns about a possible BHBF in the May/June 1998 timeframe. The group was reminded about the experimental nature of adaptive management in our efforts to mitigate resource effects. When considering resource impacts, it is actually possible to accomplish impact levels of zero? Is there a impact level above zero that is permissible? Is it a renewable or non-renewable resource? We need an ecosystem checklist with limited of acceptable change and a rating to ascribe relative impact in order to weight the impact. TWG discussed the following:

Resource Triggers:

- 1) High probability to achieve certain benefits
  - reduce export of sediment
  - deposit sand as bars/beaches
  - critical sediment opportunities
  
- 2) Protect/Minimize/Mitigate/Monitor Impacts to Sensitive Resources ("Exhibit C - Critical Ecosystem Elements Glen and Grand Canyon" from Operating Guidelines Associated with Glen Canyon Dam Operating Criteria, Interagency Agreement 97-SLC-0333, July 7, 1997) *(see Attachment 2, Appendix 11 of these minutes)*

Resource Criteria for BHBF:

- 1) Potential Resource Impact from "No Action."
- 2) Sediment Available
- 3) EIS Listed Benefits
  - beach/bar building
  - backwaters
  - scour exotic vegetation
  - aggrade cultural sites
- 4) Compliance Issues
  - TES: HBC, KAS, SWWF
  - Cultural
- 5) "Do No Harm" (trout, recreation, beaches, Glen Canyon Reach)

TWG identified resources that can be mitigated against and resources that are not significantly impacted:

Sensitive/High Value Resources ("show stoppers"):

- 1) KAS (Biological Opinion specifies existing level of acceptable take)
- 2) HBC (no acceptable take)
- 3) Razorback Sucker (no acceptable take)
- 4) Southwestern Willow Flycatcher (no acceptable take)

5) Cultural (Programmatic Agreement)

- Ethnobotanical: TCPs (consultation is required on TCPs)

Other High Value Resources (also "show stoppers"):

- 1) Trout (Lees Ferry recreation - tailwater fishery)
- 2) Other Native Fish

No Significant Impact (not "show stoppers")

- 1) Power Revenues
- 2) Other native fish - monitor
- 3) Other TES - probable "no effect" (bald eagles, etc.)
- 4) Recreation
- 5) Flannelmouth Sucker - species needs evaluation and monitoring
- 6) Aquatic Food Base
- 7) Terrestrial Vegetation (weed seed distribution - timing and stage)

The group identified elements of concern regarding Trout Resources:

1. Downstream displacement of young-of-year trout. Hatching occurs in winter/early spring. November-March is spawning season. A flow later in the year is preferred. Criteria: no extensive loss up to fingerling size (extensive loss is not anticipated).
2. Foodbase. Anglers cannot fish during high flows (no beaches). There is not enough data on how the fish utilize the foodbase. Cladophora offers little nutrients and does not appear to be an important foodbase to trout. Criteria: no extensive loss of Cladophora (filamentous algae) or scuds (amphipods).
3. Spawning Beds/Habitat. Impacts to Redds. Criteria: no extensive loss of Redds.
4. Sport Fishery. Sport fishery satisfaction. River-grown rainbow trout only (stocked trout not an option); 100,000 adults needed. Large income generator for the State of Arizona. Economic impacts when flows are rescheduled. Criteria: reduce income loss by scheduling high flows in the middle of the week, short duration preferable, advance notice, more information, evaluate impacts. Also applies to down river boating.
5. Non-native/native fish interaction. Loss of sport fishery if Flannelmouth Sucker becomes a listed species. Criteria: increase protection activities and monitoring, especially for Flannelmouth Sucker.

*Recommendation:* GCMRC will continue its work on developing ways to measure change in resources.

6. Public Input and Notification. Criteria: advance notice.

**Video: 1980s Glen Canyon Dam Spillway Repairs:** USBR will bring the video to the next TWG meeting.

**Kanab Ambersnail Recovery Logistical Support:** (Attachment 8) Dennis Kubly (AGFD) requested from GCMRC logistical support to attempt to reestablish a second KAS population. Three sites have been identified which can support populations, and it is hoped that at least one site will be self-sustaining. The existing sites are not easily accessible. They need to transport the snails from Vaseys Paradise and other sites as well as logistical support to monitor the translocated KAS. 5-6 trips have been requested. GCMRC is requesting approval from TWG and AMWG. Combining the recovery work with other prescheduled trips will decrease costs. Some trips are 15-18 days. Stand-alone costs would be approximately \$30,000. Barry Gold and Jeff Sorenson are investigating cost savings to pair them with other trips. The first independent trip requiring support is scheduled for March 10. Permits must be obtained as soon as possible. GCMRC is supportive of these KAWG activities. Issues include if this activity will be counted as Sufficient Progress in FWS' Biological Opinion which is yet to be written, or related to the BHBFs we may or may not have this year? Funding issues were discussed including Reclamation's concern that only the portion of the project associated with establishment of a second population be funded by power revenues from the AMP budget. Other agencies with projects associated with recovery should fund their own portions. TWG needs to respond to dam operations issues and make sure work gets done to satisfy requirements of the existing Biological Opinion for a second KAS population before another 45,000 cfs flow. Repopulation is an element of the Strategic Plan and within the scope of the GCMRC program. Wayne Cook stated that it should not come out of GCMRC's \$7,000,000 budget. TWG's decision is to recommend the logistical support and not funding. Dennis Kubly stated that the NEPA compliance documents associated with moving the snails is being developed with the NPS and FWS. FWS will do an EA.

**Recommendation:** TWG recommends that GCMRC support the logistics for FY98. KAS Ad Hoc Group formed including B.Gold, D. Garrett, B. Moore, D. Bills, D. Kubly and Johnny Ray (GCNP) to meet and work on details regarding the funding issues. Debra Bills will bring the EA back to the TWG.

**Formats for Electronic Transmission Ad Hoc Group** The GCMRC Secretary reported that the Acrobat software has been received and documents will soon be available in the .pdf format on the GCMRC web site.

**Recommendation:** Committee recommended to dissolve the Formats for Electronic Transmission Ad Hoc Group. Large documents should be saved as compressed files to fit onto a diskette. Written feedback was received suggesting that members who distribute handouts should provide an electronic copy to the GCMRC Secretary so they may be posted on the web

site along with the minutes for reference.

## **NEW BUSINESS**

**Remote Technology:** (Attachments 9a-c) Dave Garrett reported that the future direction that GCMRC has planned to monitor physical resources in canyon is the use of remote technology. It will result in less intrusion to the canyon environment from boat trips and cables, less use of permit structures, etc. He reviewed equipment needs and associated budget for FY98/99/2000. FY98 needs for FY2000 system-wide channel mapping technology is estimated at \$116,000 for equipment costs. FY99 pilot studies for use of Lydar Mapping will be \$150,000-180,000. It will cost \$400,000-600,000 in FY2000 for channel mapping using Lydar and multi-beam acoustic hydrography technology.

### **Action Items/Deadlines/Future Agenda:**

Action items were reviewed with the committee members and are included under specific topics in these minutes. Proposed future agenda items were revised and will be attached to the next agenda.

**Public Comment:** The Chairperson asked for public comment at the end of each major topic. Non-member attendees provided specific topical input which has been incorporated into the text of the issues. No other comments were made.

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