Glen Canyon Adaptive Management Work Group (AMWG)

FINAL

Minutes of January 15-16, 1998 Meeting
Phoenix, Arizona

Welcome and Introductions
Stephen Magnussen introduced himself as the Secretary's Designee and Chairperson for this committee. He welcomed the committee members and visitors to the second Adaptive Management Work Group meeting.

Roll Call (Attachment 1)
The members introduced themselves and identified whether they were an appointed member or an alternate. A quorum was present and the Chairperson declared the meeting to be official. The Chairperson reminded the committee members to submit a letter in advance if they will be sending an alternate. Alternates will be allowed to vote and speak on issues as if they were a member.

Agenda: The agenda was reviewed.

Recommendation: On motion duly made and seconded, the agenda for this meeting was approved. Future agendas are to state that public comment will be requested after each major discussion item.

ADMINISTRATIVE ISSUES

Discussion at the last meeting included the public being allowed to comment at the end of each major issue before the committee votes, rather than at the end of the meeting. A time limit will be imposed to enable the committee to complete its agenda. The Operating Procedures may need to be revised accordingly.

Approval of Minutes (Attachment 2): Minutes of the September 10-11, 1997, meeting were reviewed. On motion duly made and seconded, they were approved.

Operating Procedures: The Chairperson requested comments to the draft AMWG Operating Procedures dated October 14, 1997. Minor revisions were made to the content (see Attachment 10 from November 21, 1997 Mailing).

Recommendation: On motion duly made, seconded and carried, the AMWG approved its Operating Procedures pending legal review.

Discussion: Robert Winfree stated that, as charged, the Technical Work Group reviewed the FY99 Adaptive Management Program and GCMRC budgets. Because the budget figures are submitted two years in advance, the TWG did not have input into the overall budget. The TWG respectfully requests that AMWG allow it to review out year budgets and provide input regarding program needs before the budget figures are finalized. The review will begin with

the FY2000 program and include future budgets.

Recommendation: On motion duly made, seconded and carried, the AMWG charged the Technical Work Group (TWG) to become involved in reviewing out year budget figures and make recommendations to AMWG.

Environmental Compliance

NEPA/ESA General (Attachment 3)**:** Tony Morton (USBR) distributed information on NEPA compliance. He reviewed basic NEPA compliance as recommended by the TWG and its NEPA/ESA Issues Ad Hoc Group.

Guide Representation: Bruce Taubert stated that concerns of guide and citizen groups in Marble Canyon regarding small level beach-building flows may not be fully represented at AMWG. Pam Hyde stated that some AMWG members have made special efforts to meet with these groups and assure them we are willing to represent their interests. She felt that we could make more of an effort in the future.

Biological Opinion: In December 1997, Reclamation provided to USFWS a report on sufficient progress toward the RPA. Christine Karas (USBR) and Debra Bills (FWS) met and reviewed each item. Debra Bills is developing a formal response. Some items still need to be accomplished from the 1996 and 1997 test flows. Study designs are needed on KAS repopulation, HBC overwintering survival factors, and low steady flows. The NEPA/ESA Issues Task Group issues document suggests the formation of a Biological Opinion Task Group. "Appropriate state wildlife agencies" will be added to the list (revision to "report of the NEPA/ESA Issues Task Group to the Technical Work Group" document, page 3 of Attachment 4). If formed, the task group would report back to the TWG, as defined in TWG Operating Procedures.

Recommendations: Tony Morton, Christine Karas and GCMRC will meet today and set up a meeting within the next 2 weeks to determine how to efficiently proceed with completion of the 1996-1997 flow-related items.

TECHNICAL WORK GROUP

Formation and Activities: Robert Winfree, TWG Chairperson, reviewed charges given to the TWG at AMWG's September 10-11, 1997 meeting. TWG was to develop operating procedures, resource management questions and objectives, criteria and standards for long term monitoring and research, contribute to required reports being delivered to AMWG, make recommendations to AMWG, develop criteria for flood events, bring additional issues back to AMWG, and work towards consensus or majority opinion. TWG has reviewed or

produced 13 documents which were forwarded to AMWG for information and approval on November 21, 1997, and December 18, 1997 (attached hereto). Robert Winfree reviewed the content of each document.

TWG Operating Procedures:
Discussion: TWG respectfully requests approval to forward a single, 30-day mailing to the AMWG instead of the currently required 60-day mailing. This will facilitate more efficient information gathering and report completion. Recommendation that AMWG accept the operating procedures pending legal review, including any recommended changes by AMWG.

Recommendation: On motion duly made and seconded, AMWG approved a single, 30-day mailing from the TWG to the AMWG, and approved the operating procedures pending the aforementioned revision and legal review.

Payment for TWG Attendance:
Discussion: Full participation of all members of the TWG is critical to the successful completion of its charges. Some members have requested assistance for expenses related to TWG meeting attendance. TWG has an opinion that legally, the agencies can reimburse their travel on a case-by-case basis. Recommendation that AMWG approve authorization to reimburse the *few* official members for whom TWG meeting attendance creates a financial hardship. This issue has been fully discussed by the TWG, and Phoenix, Arizona is overall the least costly meeting location. The expense is estimated to be approximately $30,000 per year, and will be based on the number of reimbursement requests received. The USBR has a trust responsibility to tribal members to encourage participation. Steve Lloyd stated that needy non-tribal entities who have travel fund needs would be funded out of power revenues. John Shields asked that reimbursement be granted to Wyoming until agencies can add this unanticipated expense to their budgets. Some AMWG members felt that controls need to be instituted so the funding will last. Charles Calhoun stated he expected future sharing of tribal participation expenses by other Department of Interior agencies with similar trust responsibilities.

Recommendation: Charles Calhoun confirmed that for FY98 the USBR will assume through its Native American Affairs Funding Program the funding requirements up to $30,000 to cover the Native American per diem requirements and the non-government travel expenses covered through power revenues. He stated that this is a temporary measure to mitigate the issue. It is recommended to the agencies that another source of funding for tribal activities for FY99 outside of power revenues is needed.

Management Objectives:
Discussion: The objectives were produced in FY96 to guide planning for the FY98-99 plans, and were used in GCMRC's strategic plan. They were formed by an ad hoc group of the Transition Work Group. They are important for developing information needs for

planning GCMRC's research programs. TWG respectfully requests that AMWG adopt the management objectives for the FY98-FY99 plans and current strategic plan. Also, that TWG be charged to re-visit and prioritize the management objectives and information needs prior to development of the FY2000 monitoring and research plan.

Recommendation: On motion duly made, seconded and carried, AMWG accepted the current management objectives for FY98-FY99 and tasked the TWG to revise the management objectives and information needs for the FY2000 monitoring and research plan. TWG shall report back at AMWG's mid-year meeting.

Science Advisory Board:
Discussion: The TWG respectfully requests that it be tasked by AMWG to review the issue of the directive contained in the EIS to establish an independent science review panel which reports to the AMWG and is advisory to GCMRC. The Chairperson referenced Chapter 2, page 37 of the FEIS. The panel would advise if the GCMRC is accomplishing its goal of proper science by reviewing the entire science research effort. Funding exists in the budget, and GCMRC would like the board to be established before the end of summer 1998. Dave Garrett and Robert Winfree clarified that this panel is not the same as any existing panels (i.e., NRC, Peer Review Panel). The AMWG was informed that concern was expressed at the December 1997 TWG meeting that the SAB's role not usurp the AMWG and the TWG's function.

Recommendation: On motion duly made, seconded and carried, the AMWG charged the TWG with establishing the scientific review panel and to bring a proposal to the next AMWG meeting for formal ratification. The panel will be established according to the EIS Federal Advisory Committee Act (FACA) guidelines. The TWG will be allowed to begin its work to assist the GCMRC in meeting its March needs. If possible, TWG and GCMRC will put the review panel in place before the next AMWG meeting. At the next AMWG meeting the charge of the SAB will be discussed and agreed to.

Flash Board Proposal: ("Installation of Spillway Gate Extensions" in 12/18/97 mailing)
Discussion: Robert Winfree stated that in the ROD, the Secretary opted to have 4.5 foot extensions installed on both sets of spillway gates at GCD. The purpose was to increase USBR's ability to safety control high runoff and not spill large volumes of water downstream. Taking into consideration spring spikes, the November, 1997 flows and possible changes in operational scenarios, the TWG respectfully requests AMWG to charge them with reviewing the parameters for which the spillway gates were originally thought to be intended to determine if they are still valid. Before funds are expended on NEPA compliance activities and extensions are installed on the gates, the TWG would like to investigate other operational possibilities in lieu of installing the flash boards, and the implications thereof. If it is recommended that the flash boards are the best option, USBR would do NEPA compliance and begin the physical work to accomplish the installation. If it

is recommended that other operational scenarios such as BHBF's may provide a reasonable level of reliability that the spill frequency can be kept to 1:100, installation of the flash boards may not be necessary. Larry Stevens (GCMRC) stated that previous information about negative effects of spills has been replaced with new information as we continue to learn about beneficial effects of high flows. Gene Jencsok and John Shields voiced concern that the states' position be protected regarding impacts to conservation storage in Lake Powell. One of the intentions in the EIS is upper basin yield not be reduced by GCD operational changes.

Recommendation: On motion duly made, seconded and carried, the AMWG charged the TWG with investigating the parameters for which the spillway gates were originally thought to be intended to determine if they are still valid. Findings will be reported back to AMWG.

BHBF Releases Above 45,000 cfs:
Discussion: Tom Moody (GC Trust) stated that the TWG was not to study issues the AMWG had not tasked them with, but could request issues be studied. Three important flow operation issues that need further study were identified during the TWG's deliberations that need further study. The TWG respectfully requested the AMWG formally task the TWG with further investigation of the following issues:

1) Benefits of flows over 45,000 cfs.

2) Broader fluctuations within powerplant capacity. Some of the conclusions from the analysis of the data from the 1996 flood indicates higher than 45,000 cfs flows may be beneficial.

The basis for broader fluctuations in powerplant releases includes economic benefits. Recreational and environmental interests are mixed, and there is a need for further examination and discussion. Some negative effects were caused with the 1996 extended period of high steady flows, and fluctuations may or may not prove to be beneficial to the resources. Dave Cohen referred to the resources effects matrix sent to researchers by Barry Gold (GCMRC). Barry Gold stated that analysis of the matrix needs to be finalized before being presented, but the first tally indicated that in any month from January-June the researchers found negative effects on many of the biological resources. He plans to hold a meeting of these researchers in the near future. The recovery period needs to be considered. Debra Bills (FWS) stated that the TWG had discussed the possibility of USBR/USFWS/GCMRC doing a programmatic evaluation on the flood issue of greater than 45,000 cfs before 6 months.

Recommendation: On motion duly made, seconded and carried, the AMWG tasked the TWG, in conjunction with the GCMRC, to explore technical, institutional questions and evaluate costs and benefits in all resources as well as necessary compliance issues (ESA, NEPA,

NHPA and other relevant acts, and make a preliminary assessment and give AMWG a progress report on the two issues at its next meeting.

NEPA/ESA Task Group:
Pamela Hyde stated that TWG discussed NEPA and ESA compliance activities and tasked an ad hoc group to review the issues (Attachment 4).

1) *What does Adaptive Management mean relative to NEPA and the ESA? Do we need new or revised NEPA documents?* The decision-making process and parties involved must be documented to meet NEPA requirements. Certain "common elements" identified in the FEIS and the ROD will need separate NEPA compliance and documentation.

2) *Coordination of Biological Opinion (BO) responsibilities with GCMRC's science program.* The current coordination process can be strengthened to include a description in the work plan of how BO issues will be addressed by Reclamation and GCMRC. GCMRC's annual plan can specifically identify BO issue elements to assure they are being addressed. An ad hoc group to coordinate BO issues should be formed including representatives of USBR, USFWS and GCMRC.

Recommendation: The AMWG recommended the inclusion of appropriate state wildlife agencies to the TWG's BO Issues Ad Hoc Group.

3) *Effectiveness of communication among USBR, USFWS and the TWG to accomplish AMP goals.* Current communication is deemed to be adequate and effective.

Bruce Taubert advised that the TWG may wish to wait on this issue until the workload has diminished from other important assignments currently being tasked by the AMWG.

November 1997 High Flows

Discussion: (Attachment 5) David Garrett reported that evaluations are still in progress on last year's 31,000 cfs flow. Joe Hazel, Mark Anderson and Larry Stevens gave overviews of the implications on physical and biological resources. Joe Hazel is involved with the NAU sandbar monitoring program. He stated that since 1996, large volumes of sediment were deposited into the system, and it was hoped that a flow of this size would redistribute some of the sand. Some erosion of the beaches and a 3% increase in sandbars was reported. At this time it is inconclusive if the 31,000 cfs flow arrested the erosion rate. Better results may have been realized with a longer duration flow of this size. Gregg Fisk compared data collected on water sampling, sediment and discharge sampling with the 1996 flow. He stated that larger particles on top of the bed tend to retain sediment and minimize transport rates of the underlying smaller particles. There was not a lot of transport out of the Glen Canyon

reach. Mark Anderson stated that larger particles exist post-dam and higher energy flows (than 31,000 cfs) are required to transport them. Flows of this size may be better for providing nutrients (which exist more in smaller particles) than for building sandbars. Deposits were not as thick as the 1996 flood, and larger particles were on top which is useful in reducing downstream sand transport. The fine sediment coarsened significantly. We originally thought an event should be right after a high flow in the Paria, but we may be able to wait longer. Larry Stevens reported that the two endangered species, the Humpback Chub and the Kanab ambersnail (KAS) were of concern. We do not know enough about Humpback Chub mortality to make good decisions about high flow events. This will be studied over the next two years. There did not seem to be impacts to Chub. Future planning includes development of a Chub genetics management plan, genetic broodstock and a potential second establishment. We can predict the impacts on the snail population. Controlled flows have expanded the snail habitat. AGFD moved 14 snails to the Phoenix Zoo with the intent to start a population at the zoo and potentially used in recovery efforts. Four square meters of habitat were removed from the flood zone, and some snails are being propagated on the habitat. Habitat below the 31,000 cfs flood stage was lost. Vegetation persisted and will recover over the next couple of years. The incidental take level was not in excess of 10% of the populated habitat, and remained well below 1% of the overall population[1]. Snails located at the zoo may be viewed as part of a special endangered species tour. No large scale stranding of non-native fish occurred (three trout stranded), and there were no impacts to the *Gammarus lacustris* food base.

David Garrett stated that this was an important adaptive management and science experience. We may also learn that a 20,000-22,000 cfs sustained flow may not rapidly deteriorate beaches as was previously assumed. Reports on three events are being developed on long-term sustained flow, Paria input, and 31,000 cfs flow. Some biotic, physical and native species research was not conducted due to the $150,000 budget constraint. He identified a problem that the public and media requests results immediately after an event when monitoring is still occurring. It is also difficult to prepare reports within six months for the upcoming AMWG meeting. He does not want the scientists to feel pressured into making conclusions if they have not been allowed enough time to fully analyze the data.

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[1] *Technical Correction to Minutes:* The November 1997 Habitat Maintenance Flow (HMF) lasted 2 days, and inundated 29.79 m2 of existing habitat (3.5% of the estimated existing total primary habitat) at Vaseys Paradise, scouring 4.3 m2 of habitat (0.5% of the estimated total primary habitat). That HMF eliminated no more than an estimated 181 KAS, which was approximately 0.5% of the estimated total KAS population at Vaseys Paradise (Kanab Ambersnail Interagency Work Group 1997b).

BEACH/HABITAT-BUILDING FLOW (MARCH 1998)

Approach to BHBF Trigger Criteria:

Forecast: *Discussion:* Randy Peterson distributed and reviewed Snow Conditions for the Upper Colorado Region (Attachment 6a, dated January 9, 1998). Currently the snowpack is below normal basin wide. There is a 1%-2% risk of spill next spring. Expected release patterns were discussed, which will be in the 15,000-20,000 cfs range through the end of February. Releases from Glen Canyon Dam (Attachment 6b) will remain high. Reservoir releases will be approximately 2 MAF (10-15 feet) to provide additional space to allow us to avoid loss of control due to the possibility of strong spring precipitation threatening safety of the dam and the riverine ecosystem. He discussed the similarity between current conditions and those of the 1983 El Niño conditions which culminated in an unexpected late spring high runoff causing an uncontrolled spill and severe cavitation to the spillways at Glen Canyon Dam.

Triggering Criteria: (Attachment 6c) Randy Peterson referred to a section in the 1996 AOP which describes the changes in timing of BHBFs from years of low reservoir storage to high reservoir storage. In the September 1997 AMWG meeting, the TWG was tasked to define triggering mechanisms and make a recommendation to the AMWG which would then be referred to the Secretary of the Interior. It is not a separate negotiation, but a defining of the risk levels implicitly contained in the 1996 agreement.

Randy Peterson clarified that the decision window to run or not to run a BHBF is from the current forecast until the next forecast. Forecasts are released on the 5th (working day of the month) and again on the 15th-16th of each month. After the first forecast of the year, the 140% of normal trigger is not addressed again. A decision would be made within a couple of hours of receipt of the forecast if Reclamation would need to begin releases above 25,000 cfs. The risk level changes with each new forecast. If the risk is gone, there is no justification for a BHBF in the 1996 agreement. During the decision period, approximately 20,000 cfs flows are released in order to evacuate storage in the reservoir. If May is very cold and wet we would run a spike flow followed by 25,000-30,000 cfs releases, and then decreasing flows. The TWG recommends to the AMWG that a spike flow be run first at any time releases are expected to exceed 25,000 cfs. Sediment and other resource conditions as well as environmental compliance issues would need to be addressed. The TWG will be working on a programmatic agreement compliance document to achieve compliance completion within a short time to facilitate running a BHBF. If the purpose of a spike flow is to minimize sediment transport, it would be beneficial whether the sediment load is high or low because the volume of water released mitigates the loss of sand in the system.

There could be a condition where the criteria are triggered but it is determined that a BHBF

would be detrimental to the resources, and it is decided not to run a BHBF, high flows would continue until the dam safety concern was over. The question was asked who will determine the releases. That decision will be made by Reclamation after determining the trigger criteria has been met, compliance has been accomplished, and the resources are not going to be severely impacted. This proposal is for adoption of the hydrologic criteria.

Recommendation: On motion duly made and seconded, the AMWG adopted the hydrologic criteria specified by Randy Peterson including suggested amendments (in italics) (Attachment 6d) as follows:

1. If the January 1 forecast for the January-July unregulated spring runoff into Lake Powell exceeds 13 MAF (about 140% of normal), *assuming that Lake Powell is at approximately 3678 feet elevation (21.5 MAF capacity),* or

2. Any time a January-July Lake Powell inflow forecast would require a powerplant monthly release greater than 1.5 MAF *(25,000 cfs average monthly flow).*

Potential BHBF Spring 1998:

Concept: Dave Garrett distributed and reviewed a hydrograph for a proposed 45,000 cfs BHBF lasting 2-4 days between January to July, 1998 (Attachment 7a) . It includes minimal science research for sixteen activities, budget, what the implications would be for fluctuating flows and sustained level flows before and after these events, and scientist evaluations.

Estimated Cost: The total 1998 budget is $1,090,000. Some researchers believe these funding levels are too low. GCMRC can re-program only $60,000-70,000 of its budget to run this event. $900,000 would have to come from another source to fully fund the event. Robert Winfree stated that TWG determined seven observations or conclusions, including: importance of the BHBF, research and triggering criteria, monitoring and research of impacts, proposed budget amounts, etc. The TWG is encouraging agencies to assist the GCMRC in providing funding for the BHBF. If full funding does not occur, TWG and GCMRC will refine research details to reflect the available funding levels. For the FY2000 monitoring plan, TWG recommended that GCMRC work to integrate flow modeling. Also to identify research accomplishments that produce economies for future flow planning. It is anticipated that the future research budget for BHBFs would drop to below $500,000 because we will be validating previous research. Some information was not requested to be researched or may not be required to monitor multiple times, and logistics costs will be less. TWG recommends that AMWG accept GCMRC's proposed research plan, the agencies work toward providing funding, and that TWG be prepared to work with GCMRC to refine the details to reflect the available funding.

The members discussed at length budget planning for future BHBFs, should they be recommended. The group agreed that funding amounts should substantially decrease over

time (especially with remote sensing technology in place). Funds should be in addition to GCMRC's base budget for a given fiscal year (rather than canceling planned research and using that money to accommodate a BHBF). The funding should be built into the budgets in advance, and if a BHBF is not recommended, the money would be utilized for other monitoring and research needs. Power managers emphasized that they must come up with the money, which is charged to power users, whether it is used for a BHBF or not. It was suggested that David Garrett work with the GCMRC staff and the TWG over the next 12 months on a plan which addresses stakeholder information needs. The Chairman requested a plan which includes a clear understanding and expectation regarding funding to accommodate these events be presented to the AMWG at its January 1999 meeting when the group will be discussing the FY2001 budget.

Concern was expressed by some AMWG members that although this decision body will not meet again until after the possibility of this event has occurred, the AMWG has not been allowed enough time to fully evaluate its decision. It was pointed out that each AMWG member has a TWG representative with whom to review issues regularly. It was also stressed that time is of the essence in simultaneously readying many elements of this process, and our preference is to run a planned, controlled event rather than risk potential negative impacts to dam safety and the ecosystem due to an uncontrolled flood.

AMWG did not reach consensus on the recommendation and tasked a smaller group to meet and prepare a summary of flood elements (Attachment 7b) and a compliance timetable (Attachment 7c). Robert Winfree reviewed the papers and the AMWG discussed details at length and revised the seven-step flood elements plan. A brief summary includes: development and operation initiation of resource-based criteria for BHBFs; lawful and efficient completion of environmental and cultural compliance, consultations and permits; AMWG agency representatives immediately initiating (clarification: initiate now, not when the triggers are in place) communications to identify (clarification: identify what needs to be done, how quickly it can be processed after completion, and the staff responsible for permitting or consultation requirements, and communicate and delegate that responsibility to your staff) and expediting all administrative requirements; GCMRC conducting of appropriate monitoring and research if a BHBF is run; GCMRC working with the TWG to develop and refine necessary research designs and secure funds to carry out the scientific program; USBR's representative immediately notifying the Secretary's Designee, the AMWG, the TWG, and the GCMRC if the hydrologic criteria are met and environmental compliance is complete, and the GCMRC immediately providing the Secretary's Designee with an evaluation of whether resource criteria are met or not for or against a BHBF (clarification: based on the scientific analysis of the resource and a comparison to the resource criteria TWG puts together with delegated authority of this group).

Sam Spiller requested that a letter be forwarded as soon as possible to himself or Nancy Kaufman specifically reviewing the plan and addressing the Southwest Willow Flycatcher (SWWF) and projected dates. Ms. Kaufman is concerned about potential impacts to SWF

habitat. Christine Karas stated that the biological assessment will include an in depth analysis of late season flows on the SWWF habitat. She felt it may be useful to include the month of April in the SWWF assessment. The AMWG reviewed potential impacts to resources in the riverine corridor. Kanab ambersnail (KAS) impacts and requirements for a second population were discussed at length. Jeff Sorenson (AGFD) stated that it is planned to relocate three separate populations of KAS in hopes that at least one of the populations will become self-sustaining. Ten sites located in GCNP have undergone a criteria evaluation and a 12-step process. No tribes are on the working group. Future plans are to establish and downlist KAS. Bruce Taubert requested copies of GCMRC's recently-awarded contract proposals to expedite permit application requirements. Barry Gold stated that the SLC contracting office will not release them until they are finalized. GCMRC cannot release the details of the contracts, but the Principle Investigators may submit their proposals when they apply for their permits.

Recommendations: Delete "experimental" from the title on the hydrograph paper. Charles Calhoun will forward a letter on SWWF (referenced in the above discussion) to Nancy Kaufman. A motion was made, seconded and carried to further discuss on January 16, 1998, issues regarding flood elements and compliance timetable. On a second motion duly made, seconded and carried, AMWG adopted the revised seven-step flood elements plan. AMWG charged the TWG to carry out the elements of the seven-step plan (specified in Attachment 7b and outlined in the above discussion). AMWG shall receive a copy of the Secretary's Designee's response regarding the resource criteria evaluation notification (if notification is received that the hydrologic criteria are met and environmental compliance is complete).

Public Comments: The Chairman asked for public comments. There were none.

Temperature Control Device: David Trueman reported the status of USBR's progress on USFWS' biological opinion Reasonable and Prudent Alternative (RPA) on temperature controls. The purpose of temperature control is to warm the water to assist in Humpback Chub (HBC) recovery in the mainstem. Modeling and algal studies are being concluded. A preliminary design of the facility has been completed. It will cost approximately $15,000,000 to modify the intake structure on the dam. The existing dam structure would be utilized to draw water from different levels from the eight penstocks, route it through the powerplant and then downstream. Recent modeling tests indicate that we can use four penstocks to increase the water temperature up to 15^{o}C which meets our objective. Lake temperature at the Wahweap monitoring station indicated water temperature was not impacted more than one degree centigrade. It appears that it will not cool the reservoir enough to affect the shad population. They plan to release surface warm water for only 3-4 months. Temperatures are almost identical in December whether release are from the surface or not. The next design study will be a detailed specification package to determine what elevation to place the intake structures. They are currently finalizing a service agreement with the Denver Technical Service Center (DTSC) for a bid package and the cost is within

the $400,000/year budget. If funding is available and compliance complete, the package will be ready to award to a contractor to modify the intake structure in FY2000. They are reviewing the FY2000 budget to arrange construction appropriations to fund the activity. An EA for construction will be performed, and a draft will be ready for review by January 1999. The years 2000-2001 are planned for the 2-year construction period. If funding is achieved in 2002, we may be ready to operate (if the reservoir is full). In 2002, a temperature control monitoring plan needs to be in place. David Trueman suggested that GCMRC conduct the monitoring program as part of this modification to facility operations. The AMWG may wish to charge the TWG and GCMRC to consider a plan of temperature control management and adapt the management to maximize the resources. He discussed the Flaming Gorge model. It is anticipated that shad and trout will not be adversely affected, and HBC will benefit from warmer water, but this hypothesis will require monitoring. If warmer water causes non-native fish competition problems, Reclamation with recommendation from the AMWG may wish to cancel the experiment. Reclamation with recommendation from the AMWG and GCMRC will decide which years to run the temperature control, which will be determined by the first year's monitoring. The device probably will not be used during a drought year. Algal reports are available through GCMRC or Alan Haden at NAU. The feasibility study on alternative temperature controls is available. The temperature modeling study will be included in the EA and available in about a year. Bruce Moore clarified that the $15,000,000 funding is not from Section 5 construction funds (which implies repayment). It is non-reimbursable Section 8 mitigation funds. It is not part of the Adaptive Management $7,000,000 budget. David Garrett stated that we will use the same process of beginning a planning exercise now to decide information needs for selective withdrawal. The new activity will be added to the 5-year plan which will be re-addressed in the year 2000.

Recommendation: On motion duly made, seconded and carried, the AMWG charged the TWG and the GCMRC to develop work plans and be ready to implement a monitoring program by the year 2002 to evaluate the effects on the Colorado riverine corridor and Lake Powell from temperature controls when they are in operation.

1999 Annual Operating Plan Process:

AMWG Operating Procedures: The AMWG reviewed the operating procedures (dated October 14, 1997) contained in the November 21, 1997 mailing to AMWG, and made minor revisions in the foreword: "(5) the AMWG shall continue in operation until terminated by the Secretary or renewed under the Federal Advisory Committee Act." Revisions were made in the schedule for agendas (30 days) and minutes (60 days).

Recommendation: On motion duly made, seconded and carried, the GCD AMWG Operating Procedures, as revised, were adopted by the AMWG.

Status of Basin Hydrology: Randy Peterson reported that average monthly releases are

between 12,000-20,000 cfs.

AOP Process: (Attachment 8) Randy Peterson announced that next month a schedule of the April, May and June 1998 AOP meetings will be published. All meetings are open and are held at the Las Vegas airport. He reviewed the scope of discussions.

Budget:

Process: David Garrett stated that at the last AMWG meeting a request was made to identify the budget process. Three budgets are being worked on simultaneously: FY1998 is in the financial arena of spending and obligations. FY1999 is about to be announced by the President. FY2000 is being formulated. In order for USBR to complete its budget, we need agreement on budget figures by April 1, 1998, to be submitted to the Assistant Secretary of the Interior in mid-May 1998.

Estimated Program Cost Detail: (Attachments 9a, 9b, 9c) Information technology expenses have been added which would increase the FY2000 budget to a total of approximately $8,100,000.

It was suggested that TWG work with Reclamation and the GCMRC on the elements of the FY2000 budget and develop a process for future budgeting to allow more input by the AMWG. Out year budgets will be presented at future January AMWG meetings.

Monitoring and Research Center Report:

Lake Powell Synthesis: (Attachment 10) David Garrett reviewed work done regarding Lake Powell and identified a need to continue monitoring of water conditions and downstream impacts of releasing this water. He elaborated on the four recommended actions noted under "1999 Annual Plan" in these minutes. Activities to be pursued include continuing the current Lake Powell monitoring program as it has been conducted over the past several years. The program costs approximately $250,000 per year and is included in GCMRC's budget. Additional assessments of existing data will continue. A revised technical report on the Lake Powell Assessment will be provided to a TWG ad hoc group meeting on January 28, 1998. The GCMRC will work with the TWG this spring to develop stakeholder management objectives and information needs for future monitoring and research. The program is subject to change according to information needs specified and prioritized by the stakeholders.

1997-1998 Annual Report to Congress: (Attachment 11) David Garrett stated that the Report to Congress has received extensive review and input from the TWG. Bruce Moore stated that the AMWG Charter and dam water operations releases and power graphs will be added to the appendix. A suggestion was made to add more narrative on the November 1997

powerplant capacity flow (which occurred in WY98).

Recommendation: Information on the November 1997 flow results will be added to the report. On motion duly made, seconded and carried, suggested changes will be incorporated into the 1997-1998 Annual Report to Congress and forwarded to the Secretary of the Interior. The GCMRC staffing organizational chart will be added to the AMWG/TWG web site.

Public Comments: The Chairman requested comments from the public. There were none.

1999 Annual Plan: (Attachment 12) David Garrett stated that monitoring and research will be fairly consistent with activities outlined the 1998 plan. The FY99 plan includes more details on monitoring and research and related costs in the specific resource areas. The TWG had requested and received additional budget information which is not fully detailed in the plan. Next year, the TWG will be involved in development of the out year 2001-2004 budget projections, detail and refinement and programs that are associated with supplying information needs and associated costs (prior to AMWG approval).

Public Outreach: The AMWG discussed public outreach methods which include Reclamation development of a public-accessible web site containing finalized documents and information (no drafts). The current GCMRC AMWG/TWG web site is part of TWG's information gathering process and contains working drafts of documents not yet intended for public scrutiny. David Garrett suggested development of an annual public forum to present current information on the program to the general population as part of our public outreach plan.

The FY99 Lake Powell plan may be a continuation of work done in 1998. It will be further defined when management objectives, information needs and priorities are developed by the TWG in spring 1998 and approved by the AMWG. These committees may decide on a different approach. Documents will then be drafted for research, FY99, FY2000 and five-year/long-term plans. The Long-term Strategic Plan will be re-visited and re-drafted in the year 2000 to include Lake Powell work (selective withdrawal, etc.). Clarification was requested about proceeding with Lake Powell work in an out year. David Garrett stated that a previous charge from the AMWG includes approval of:

1. Continuing in 1998 the work done in 1997, including an out year FY99 program.
2. Synthesis of information gathered by GCES.
3. Review of protocols for collecting monitoring and science information for scientific appropriateness and adequacy for specified information needs.
4. Development of a conceptual modeling process of the entire system.

A need was identified for the TWG to discuss the area to be included in the conceptual model

because it should include the entire Lake Powell area.

Recommendation: On motion duly made, seconded and carried, the AMWG approved the GCMRC FY99 Annual Plan. The GCMRC secretary will update the Table of Contents. Reclamation's public outreach web site address shall be faxed to the AMWG when the site is completed.

Remote Monitoring Technology FY2000: David Garrett stated that the NPS and some tribes have requested less environmental intrusion regarding canyon monitoring techniques. He discussed the need for the program to progress into utilization of remote sensing technology. Data is gathered by fixed equipment and remotely sensed via aerial applications. It is anticipated that we will realize quality monitoring, more data points, faster information synthesis of data gathered, as well as reductions in logistical impacts, long-term costs and use of permit structures. It can be applied to generate extensive graphs and measurements in hydrologic physical sciences and vegetation areas. It will replace some of our existing ground-based work, but will not be able to be utilized in all resource areas. Remote sensing technology represents an overall $1,000,000 increase in upcoming budget years. Comparative assessments of available technology are being conducted for the physical sciences areas. For FY98 and FY99, it will cost $116,000 for physical resource area remote sensing equipment. Pilot projects should be implemented in FY2000 to calibrate the equipment for a specific area and test applicability. Upgrades may cost $400,000-$600,000 to apply this technology. Biological and cultural resources areas need to be reviewed to determine applicability. A complete set of appropriate technology is planned to be ready for review by this summer.

Cultural Resources:

Programmatic Agreement: Sign Larralde was not present. Ruth Lambert presented Sign's information on the Programmatic Agreement program status:

1. One of the requirements of the PA is to produce an Historic Preservation Plan. It has undergone peer review. Comments of the peer reviewers and PA parties (Tribes, Reclamation, NPS) will be incorporated. The projected completion of a draft is spring 1998.

2. The Advisory Council on Historic Preservation (an independent agency that oversees and works with SHPOs) has requested this PA group to present a paper at the Society for American Archaeology in March in Seattle, Washington. The PA group is preparing the report. It is viewed as a progressive and model program.

Ruth Lambert reported that establishment of master agreements between GCMRC, Reclamation, NPS and tribal groups is progressing. These will be multi-year agreements amended annually to include scopes of work in various projects. It should facilitate the

timing of releasing of funds to the groups and getting projects on track. The agreements will be mailed next week to the groups. The final language requires review by the UCR USBR contracting office.

Budget Breakdown: The TWG requested a breakdown of the cultural resources budget into the PA program and the GCMRC's Cultural Resources Program. The breakdown is shown on the charts and tables of pages 52 and 53 of the FY98 Annual Plan. GCMRC's program is $390,000. This includes RFP projects, unsolicited tribal proposals, data protocol, and conceptual modeling which are distributed by the cultural program, as well as logistics costs for on-river trips. Budget for the PA program in FY98 is $800,000.

Public Comments: The Chairman requested comments from the public. There were none.

Other Business: USGS provided a report entitled, "The Colorado River in Grand Canyon: How Does it Flow?"

Action Items: Action items were reviewed.

Next Meeting: The next meeting will be July 21-22, 1998, at a location to be announced in Phoenix, Arizona.

Possible Agenda Items for Next Meeting: No new items were presented.

There being no further business, the Chairman adjourned the meeting at 11:10 a.m. on January 16, 1998.

Respectfully submitted,

Serena Mankiller
GCMRC Secretary

General Key to Adaptive Management Program Acronyms

ADWR - Arizona Department of Water Resources
AGFD - Arizona Game & Fish Department
AGU - American Geophysical Union
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 - Final Environmental Impact Statement
ESA - Endangered Species Act
FACA - Federal Advisory Committee Act
FEIS - Final Environmental Impact Statement
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