

Glen Canyon Dam Technical Work Group

FINAL Meeting Minutes

May 3, 2004

Conducting: Dennis Kubly, Acting Chairman

Committee Members Present:

Mary Barger, WAPA
Marklyn Chee, Navajo Nation
Wayne Cook, UCRC
William Davis, CREDA
Lisa Force, Grand Canyon Trust
Lloyd Greiner, UAMPS
Christopher Harris, CRB/CA
Amy Heuslein, BIA
Matt Kaplinski, GCRG

Robert King, UDWR
Glen Knowles, USFWS
Phillip Lehr, Colo. River Comm./NV
Ken McMullen, NPS/GCNP
Bill Persons, AGFD
John Ritenour, NPS/GLCA
Larry Stevens, Grand Canyon Wildlands Council
Michael Yeatts, Hopi Tribe

Committee Members Absent:

Illa Bullets, So. Paiute Consortium
Kerry Christensen, Hualapai Tribe
Jonathan Damp, Pueblo of Zuni
Norm Henderson, NPS
D. Randolph Seaholm, CWCB

Mark Steffen, Federation of Fly Fishers
John Shields, WY State Engineers Office
John Whipple, NM Interstate Stream Comm.
Vacant, Arizona Dept. of Water Resources

Alternates Present:

Jeff English
Wayne Cook

For:

Mark Steffen, Federation of Fly Fishers
John Shields, WY State Engineers Office

Interested Persons:

Gary Burton, WAPA
Lew Coggins, USGS/GCMRC
Kurt Dongoske, CREDA
Helen Fairley, USGS/GCMRC
Paul Li, Bob Lynch's Office
Mike Liszewski, USGS/GCMRC
Jeff Lovich, USGS/GCMRC

Mark McKinstry, USBR
Ted Melis, USGS/GCMRC
Anthony Miller, Colo. River Comm./NV
Barbara Ralston, USGS/GCMRC
Chris Updike, USGS/GCMRC
Mike Yard, USGS/GCMRC

Meeting Recorder: Linda Whetton, USBR

Convened: 9:35 a.m.

Welcome and Administrative Items. Dennis Kubly welcomed the members, alternates, and general public. A quorum was established, introductions made, and attendance sheets (**Attachment 1**) distributed.

Review of Action Items - Refer to **Attachment 2**.

Glen Canyon Dam Maintenance Schedule - The TWG discussed the Glen Canyon Dam maintenance schedule in conjunction with future experimental flows.

MOTION: The BOR maintenance schedule should incorporate enough flexibility to allow implementation of AMP experimental flows.

Motion seconded.

Discussion.

Voting Results: Yes = 16 No = 1 Abstaining = 0

Motion passed.

Comments: Lloyd Greiner (voting no) – A motion isn't needed. Direction was given at the last AMWG meeting.

Arizona Game and Fish Dept. Proposal. Jeff Lovich said there was a presentation given during the recent river trip on the fish work being done on the LCR and at that time Bruce Taubert (AGFD) said his agency would be willing to provide money to get the feasibility report finished. The feasibility study would evaluate a proposal for creating grow-out ponds for HBC on terraces above the LCR. Mike Yard added the review would also look at temporary grow out areas where young fish are being supplemented, in channel approach or areas outside of the river system, in an effort to create predator free space and insure greater survivorship and reintroduction back into the system.

The TWG felt it was important to get a statement from Bruce on what he had committed to on the river trip.

ACTION ITEM: Bill Persons will contact Bruce Taubert regarding his commitment to complete the feasibility report and provide an update (or statement from Bruce) at the next TWG meeting.

Approval of March 30-31, 2004, Draft Meeting minutes. Pending a few corrections, the minutes were approved.

Discussion of Deferral Table - Referring to the "Projects Recommended by GCMRC for Deferral from FY04 to FY05" table presented at the last TWG Meeting (**Attachment 3**), Dennis asked if the TWG wanted to make those recommendations to the AMWG.

Comments:

- *The GCMRC needs to start the core monitoring plan and now it can't really do that until an AMWG phone conf call or the AMWG August meeting. (Kaplinski)*
- *It's a policy issue and AMWG needs to weigh in. (Cook)*
- *The AMWG needs to look at the items. (Heuslein)*

Jeff Lovich said the GCMRC staff has already started working on the Strategic Plan and he needs to know how to redirect work assignments if needed.

Dennis advised that Reclamation will confer with Mike Gabaldon to see if there needs to be a conference call to convey the recommendations to the AMWG and, if so, GCMRC would make a similar presentation to the AMWG and determine if they concur.

ACTION ITEM: Reclamation (Dennis Kubly) will confer with the Secretary's Designee (Michael Gabaldon) on the projects TWG approved for deferral from FY04 to FY05 per GCMRC's recommendations to see how they should be handled.

New Business:

Amy requested that Dennis provide an update of the DOI Adaptive Management Workshop he attended recently in West Virginia. Dennis said the workshop was convened by the USGS and focused on how adaptive management is currently being used and how it will be used in the future. There were a series of presentations which focused on: 1) defining adaptive management and describing how it works 2) the relationship between adaptive management and NEPA 3) challenges for adaptive management and 4) case studies. In addition, there were breakout sessions and out of those came a set of recommendations that will go to the Secretary with a response from her on how adaptive management would be incorporated. Dennis said the Glen Canyon Dam presentation included three areas: 1) accumulation of knowledge and reduction of uncertainty 2) change in resource status and trends, and 3) building of social capital.

Long-term Experimental Plan

Dennis reviewed the motion that was presented by Pam Hyde and Clayton Palmer and subsequently approved by the AMWG at their last meeting:

AMWG charges the SAB, the GCMRC, and the TWG jointly to develop a long-term experimental program that responds to the AMP Strategic Plan and incorporates existing legal requirements to be completed and brought to the AMWG by January 2005. The SAB, the GCMRC, and the TWG will bring a draft of the program to the AMWG at a Fall 2004 meeting, and the AMWG will decide at that meeting whether additional recommendations to the Secretary for flows in WY05 are necessary. AMWG requests that compliance on a January 2005 long-term experimental flow program to be targeted for completion and the program implemented by July 2005.

Jeff said that GCMRC prepared a new experimental design for the TWG's consideration today and would like to use the modified version as a foundation for today's discussion. He said Ted would introduce it as part of his presentation.

Revisiting Experimental Flow Designs for Sediment and Fishery Resources WY 2005 and Beyond Ted Melis gave a PowerPoint presentation (**Attachment 4a**).

Lew said the scope of the experiment is focused on treatments applied in the Colorado River mainstem to address two prevailing hypotheses regarded as possible causal mechanisms responsible for the recent decadal decline in the survivorship and recruitment of the humpback chub: (1) predation/competition is contributing to the decline of HBC, and (2) change in physical habitat (flows and temperature) is contributing to the decline of HBC. He suggested going from widely fluctuating flows to stable flows to see if there is a large response from the HBC. He provided more details in a handout (**Attachment 4b**).

Matt drew a diagram on the whiteboard of what he envisioned the typical flow regime would look like.

Comments:

- *Would it be important to review the MATA workshop results or are people okay with leaving those behind? Should there be a discussion on boundaries? (Kubly)*
- *We need to run the design through the MATA process before August. (Persons)*
- *I like testing fluctuations against stability and wonder why it was stopped in stable years. (Knowles)*
- *What is the ultimate purpose of the experiment? Is it to test the current modified low fluctuating flow (MLFF) or is it just to test specific resource responses to different flows and alternatives to replace MLFF? (Yeatts)*

Ted said they are still trying to establish whether or not there is an operational regime that can restore the system short of sediment augmentation and achieve some of the objectives of the EIS but what is not exclusively but perhaps dominate to try and maintain nursery habitats along the mainstem. However, that leads to a couple of questions: What is being done about the original hydrologic triggering criteria for 1997? and, When is the experiment finished? He thought that presumably the basic questions have been answered on how to agree on releasing spills - would it be a sediment trigger, a hydrologic trigger, or would it be something else? They are left with no action and doing 100% MLFF.

Dennis asked how the flow scenarios address nearshore native fish habitat, creation, and rejuvenation. He said it was discussed earlier in the week on a conference call in which they talked about measuring the effects of increased temperatures if they occur and how dynamic those features are.

Referring to Table 1, Ted said that powerplant operations would be done during the flow in which the fluctuations are occurring to try and lower the eddies. A high flow experiment would be done for two days in January and the fluctuating flows continued in order to modify the rejuvenated bar that was presumably built into some stable configuration for the fall and summer when the flows were at 8,000 cfs. By doing that, they would be using one operational regime in the designer flow concept that might actually be fairly effective at creating the nearshore nursery habitats but then following that almost immediately the next year with the opposite of those flows which presumably would be warm water under the thermal regime coming out of the low reservoir and with summer warming during passage down canyon.

The TWG continued to discuss the different flows and made adjustments to Matt's diagram to better understand the various options.

Comments:

- *We have proven for 10 years that the MLFF doesn't work and yet we want to keep hanging on to them. One of the very first things we ought to be checking on is whether we are accomplishing what we should be. If the flows are moving or transporting sediment, that's a good reason to look at something different every other year or every year and block some of those, and also see if fish really survive. (Greiner)*
- *By putting together this experimental flow package, we're in fact changing MLFF to whatever the experiment is so that when we're done with this block, we'll have a more informed way of devising what the next experiment will be. (Kaplinski)*
- *The preferred alternative is a policy. It's a policy that came out of a NEPA judgment and some people are saying that they think we're at a point almost to reject that policy. What additional evidence is needed to reject that policy and say we're seeking something else as opposed to doing a set of experiments that might address a broader range of objectives?*

- *We have to figure out what operational strategy is going to work and if we have enough science to lead us there. (Cook)*
- *This is a pretty controversial topic and whatever strategy or direction we choose, let's make sure we have the science. (Stevens)*
- *What's the connection between this experiment and the MATA results? (Barger)*

Dennis asked what GCMRC's next step would be. Jeff said that today's discussion was providing the feedback that they really wanted. He said that GCMRC can provide clarification on hypotheses tested or any various other technical issues, but that ultimately the experiment needs to meet the program's need for responding to the information about the effects of the various flows on the resources.

Ted added that his sense was that people were asking whether to have an all or nothing experiment, all high fluctuating flows as indicated in the EIS or stable flows. He said when it says fluctuating, it means replacing all MLFF with HFF and then two years later there are no fluctuating flows. He said August seems to be a critical month in terms of the warming so it seems like that month needs to be turning point to maximize warming by having low flows and then counter that with not doing that and see what the effect is. He added that perhaps they're just trying to continue MLFF to say ROD operations are still being done but there seems to be month-by-month and season-by-season basis some rationale for continuing the ROD in certain months and certain seasons for the benefit. It has not been a complete failure. Recreational boating and camping have benefited, but marshes haven't done very well, and sandbars are getting smaller. He suggested developing some type of seasonal hybrid with designer flows and retaining MLFF in certain months for the future because there is a benefit for doing it.

Dennis said the three critical months of May, June, and July are when small HBC are emerging from the LCR and under the present thermal regimes, they're basically dying. There is no evidence that they survive but looking into the future with temperatures increasing and the potential bottleneck of MLFF going away, he questioned whether they could justify the tradeoffs. Because those are critical months for the power industry, he thought they might want to consider doing some type of stepdown or titration effect in that period of time.

Ted said that perhaps they could use two-year blocks moving from the winter further into the spring and summer with HFF and that would prove to be a titration. Ted said he specifically asked Carl if that could legitimately be done and Carl said it could.

Matt commented that replacing MLFF is assuming that it is being replaced with something better and he hasn't seen any analysis that indicates high fluctuations vs. modified low fluctuating flows is going to be any better. He asked if Dave Topping had taken a certain month-long MLFF and done an unconstrained or load following compared to sediment transport from both of those. Ted said they hadn't and that was they needed was a projected output of daily operation, hour by hour, for those kinds of things.

Lloyd said his biggest concern with the MLFF during peak power months is the 8,000 daily deviation. If they want to run 5,000-45,000 cfs every day or whatever number they choose, the real issue is the 8,000 cfs constrained on the river. He explained that in a high volume month, you end up with 12,000-20,000 cfs but you've got a high average flow. You're pushing sand down the river for four months. He asked if the deviation was going to be a problem.

Dennis said that the TWG has between now and July 9 to prepare something for the AMWG to consider at their August 9-10 meeting. He asked if an ad hoc group should be created to address the concerns brought up at today's meeting. He also felt it would be a good idea to have a conference call with the TWG for concurrence on what is to be presented to the AMWG.

Larry advised that he felt the resource matrix in the EIS would be a good starting point for those discussions.

Matt said he thought the group should start with the management objectives and information needs that were developed as part of the Strategic Plan.

ACTION ITEM: The TWG developed the following questions for GCMRC:

- In the GCMRC plan during years of fluctuating flows, is sediment transport modeling needed to estimate the response of sediment to high fluctuating, MLFF, and steady flows?
- In the GCMRC plan during years of fluctuating flows, what daily fluctuations would optimize hydropower production?
- In the GCMRC plan during years of fluctuating flows, what are the impacts on recreation and safety of the fluctuating flows?

- In the GCMRC plan during years of steady flows, what would the distribution of releases be if the monthly releases followed the pattern of the pre-dam hydrograph?
- In the GCMRC plan during years of steady flows, what would the effect of those flows be on the Lees Ferry Drift?
- In the GCMRC plan during years of steady flows, what would the effect be on the pattern of hydropower production?
- In the GCMRC plan during years of steady flows, what would the effect of dropping flows from 14,000 cfs to 8,000 cfs have on the availability of rearing habitats?

- In the GCMRC plan during years of mechanical removal, are there some metrics in addition to recruitment for assessing status and trends of HBC?
- In the GCMRC plan for mechanical removal, will evaluations be made for methods to remove other non-native fish, particularly cool water and warm water species?

Dennis asked what other questions were missing and whether there was data to help them estimate the effects on water quality. A fundamental concern he had was with the advantages and disadvantages of hitting the system with the extremes as opposed to moving incrementally in smaller changes away from MLFF. With the extremes of fluctuating and stable flows being chosen, they need to have some good answers when they inform the public of the changes. He asked if it was in GCMRC's plan to evaluate methods for controlling cool water and warm water fish that are either in the system or could invade particularly as the TCD goes in. It's one of those ancillary studies that would have to be done. He reminded the group that the science advisors' recommendation on the TCD was made under the assumption that there was mitigation for those negatives that were out there. In doing the environmental compliance for the TCD, Reclamation is thinking about doing a bounded analysis so they would model the high temperatures and the low temperatures. The assessment would be done on those extremes but not on the actual scenarios because the scenarios are intended to be determined in the process of developing the long-term experimental plan.

Ted said they can't fully control in any meaningful way a temperature release pattern for the next 16 years so they assume Mother Nature will have a big influence. He saw it as a titration where you would start imposing control and it would be increased through time through some optimum full implementation.

Ted said scenario 2 in the 2003-2004 experiment would occur in any year where the flow treatment would be fluctuating so the response to the inputs from the Paria would be the scenario 2 continued with powerplant-capacity spikes, and trying to move sand from the mainstem into the eddies. In any year that the schedule is a fluctuating flow year, that would be

the response and any year that a stable flow response was scheduled, they would be testing scenario 1 in the July-Dec period. In any year where the triggering criteria were reached between January and July, they would be testing scenario 3 which is the immediate response to 45,000. The only differences between scenario 2 and 3 are the months in which they would occur and the magnitude of the spike that is used to try to manage the input. The difference between them in terms of discharge is 13,500 cfs.

Dennis said that the way the EA is written, scenario 1 has to occur before scenario 2 and asked if the TWG would be advocating a change. His understanding was that only scenario 1 was locked in. Ted said if they get scenario 1 tested in the first year of stable flows and then get back to back another big Paria input the following year, they're not really set up to do a test for scenario 2. He said it begs the question: When you get back to back inputs that are significant as those seen in 1997-2000, what should be done in the second stage of the year? It leads to another question: How does the system really work under no action? Ted said there were some years where the Paria didn't do anything and other years where the Paria did a lot and the powerplant was typically trying to optimize on power revenues and just by coincidence nature loaded the eddies.

Dennis questioned that if they didn't get a sediment input for 5 years and they're continuing to push sediment downstream, would everybody satisfied to sit and wait. However, if all the scenarios came through in 3 years, would there be enough flexibility to change the long-term experiment or are they locked in to what they are currently doing? Ted said they have to keep in mind that they can't control the inputs but when the inputs do or don't occur, they affect the treatment whether controlled or not and that is why there is turbidity in the mainstem.

Dennis said he didn't know what the outcome of the sediment feasibility assessments would be or if there was an undertaking by the Park Service to do a separate mechanical removal effort in the tributaries and questioned to what extent that should be incorporated into the long term research plan. He asked the TWG to consider other HBC proposals. One plan that has been contemplated recently for a feasibility assessment is putting an inflatable dam in the reaches of the Little Colorado River to stimulate conditions of impounding from high flows in the past, something which can't be done effectively with dam operations. He said it came out of the Science Advisors river trip. He asked if it made sense to just identify those things and then send them back to GCMRC with a comment that they didn't know how much it would confound their experimental design. He also asked what level of detail needs to be provided to the AMWG in August. He said the TWG is supposed to present a draft plan but the plan isn't simply more than just a matrix. He asked how much work is there to do between now and then.

Dennis asked if it made sense to consider moving the tentative June 2-3 meeting back to June 30-July 1 to allow an ad hoc group to meet and address the questions identified at today's meeting. He felt a group of 7-8 people would be a good size. The following members volunteered to be on the Long Term Experimental Plan Ad Hoc Group (LTEP AHG): Mary Barger, Wayne Cook, Bill Davis, Norm Henderson, Matt Kaplinski, Glen Knowles, Bill Persons, Mark Steffen, Larry Stevens, and Michael Yeatts. Charge: Develop a draft long-term experimental plan with GCMRC and the Science Advisors.

Adjourned: 4:50 p.m.

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Committee Members Present:

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Ted Melis, USGS/GCMRC
Anthony Miller, Colo. River Comm./NV
Chris Updike, USGS/GCMRC

Meeting Recorder: Linda Whetton, USBR

Convened: 8:05 a.m.

Welcome and Administrative Items. Dennis Kubly welcomed the members, alternates, and general public. A quorum was established, introductions made, and attendance sheets distributed.

Core Monitoring Plan. Jeff presented an update on the Core Monitoring Plan (**Attachment 5a**) and passed out copies of a memo dated April 21, 2004 from the CMAHG to the AMWG/TWG (**Attachment 5b**). Dennis said that in preparing a time line for completing the various reports, he asked Jeff what information he needs to prepare a core monitoring plan. John suggested that Jeff identify each manager's priorities. Jeff said he would like to have the top three priorities from each stakeholder but beyond that, it would take too much time for GCMRC to address each manager's priorities. Dennis said he thinks there may be a difference between managers and stakeholders because he feels managers have an obligation to address their individual responsibilities for specific resources.

ACTION ITEM: TWG members will work with their AMWG members in identifying the AMP's top 3 highest priorities for core monitoring (two pages max) and send to Jeff Lovich by May 12.

Comments:

- *Need to start looking at the Information Needs and see if those attributes are captured. (Kubly)*
- *I distinctly recalled that this body almost failed to monitor Willow flycatcher. (Stevens)*
- *I think the other thing that we need to look at is maybe not what resources need monitoring but advocacies for those resources. (Yeatts)*
- *It would be helpful to have some type of matrix to understand how the three plans fit together and also the TWG should review the MOs and INs again. (Heuslein)*

ACTION ITEM: GCMRC and USBR will develop a visual matrix or flow chart that explains how the Long Term Experimental Plan, the Core Monitoring Plan, and the AMP Strategic Plan, etc., fit together and present at the next TWG Meeting.

ACTION ITEM: Linda will post the current Strategic Plan and MOs/INs documents to the AMP web site and will send an e-mail message to the TWG once they are posted.

Dennis asked Jeff if he saw deliberations on the core monitoring plan occurring in the TWG or through the Core Monitoring AHG. Jeff said he viewed the CMAHG as doing the deliberations and then the full TWG would discuss and seek agreement on the plan. Dennis then asked why he had moved the report delivery date from Sept. 30 to August 9. Jeff said the CMAHG felt it would behoove the process if they allowed AMWG to see a draft at their August 9-10 meeting but also said he would be willing to change that delivery date if needed. Dennis said that the deadline for a draft final to AMWG was for January 2005 with an interim draft to the AMWG at a tentative meeting in the fall, according to the AMWG motion at the March 2004 meeting. Dennis advocated that all three documents be submitted to the AMWG at one time. He asked Jeff if he had a core monitoring schedule and that he was specifically thinking of a schedule for the interactions on the Long Term Experimental Plan (LTEP) and the Core Monitoring (CM) Plan. Jeff said he didn't have a schedule because it was his intent to get the draft done, obtain information from today's meeting, and then go back and start writing the plan. By the middle of May, after having received the priorities from the stakeholders, the CMAHG could modify the plan, get a draft out by June 9 for the SA and TWG to review, receive comments back from the SA and TWG by June 23, and then mail out to the AMWG by July 9.

Dennis reminded Jeff of the June 2-3 and June 30-July TWG meetings and asked if he had any milestones for the LTEP and CM plans for which the TWG could have some interaction. Dennis

asked about canceling the June 2-3 meeting and said that the TWG would need to come to some consensus on the two plans prior to September 15 in order to meet the mailout deadline for an AMWG meeting on about October 15. Jeff said he is committed to having the CM Plan finished by Sept. 30. Dennis suggested the CM Plan be sent to the TWG for review and then they could provide their comments to Dave Garrett at the June 30th TWG meeting. Based on the above deadlines, it was decided to cancel the June 2-3 TWG meeting. The TWG reviewed the schedule for completing the draft plans and agreed to advocate to AMWG that they accept it.

Dates of interaction

- **June 9:** Draft plans mailed out to TWG and Science Advisors
- **June 23:** Science Advisors meet
- **June 30 – July 1:** TWG Meeting; TWG and SA review of progress on plans
- **July 9:** Meeting packets sent out to AMWG members
- **August 9-10:** AMWG Meeting
Progress Updates
- **September 15:** Well prepared draft of Core Monitoring Plan sent to the AMWG
- **October 15:** "Tentative" AMWG Meeting
(Drafts of all three plans presented to the AMWG)
- **December 15:** Meeting packets sent to AMWG
- **January 2005:** Delivery/Adoption of all 3 documents
(Core Monitoring, Research Plan, and GCMRC Strategic Plan)

Future TWG Agenda Items:

1. TWG Effectiveness and Operating Procedures
2. TWG Chair nominations
3. Matrix/Flow Chart of LTEP, CM Plan, with SP
4. Report from PA on Progress of HPP (USBR archaeologist)
5. Hydrology Report from Tom Ryan
6. Lees Ferry management objectives
7. Ad hoc group updates – which groups are still active?
8. TWG review of progress and SAB comments on GCMRC Strategic Plan, Long-term Research Plan and Core Monitoring Plan

Documents provided at meeting but not referenced in minutes:

- Summary of Results from GCD AMP TWG Multi-Attribute Evaluation Workshop, Dated December 2003 (**Attachment 6a**)
- Summary of Results from GCD AMP TWG Multi-Attribute Evaluation Workshop, Dated May 28, 2003 (**Attachment 6a**)
- Review of Results and Recommendations from the GCMRC 2000-2003 Remote-sensing Initiative for Monitoring Environmental Resources within the Colorado River Ecosystem (**Attachment 6c**)

Adjourned: 10:25 a.m.

General Key to Adaptive Management Program Acronyms

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