

## Glen Canyon Dam Technical Work Group Meeting

February 2, 2012

**Conducting:** Shane Capron, Chairperson  
Facilitator: Mary Orton, The Mary Orton Company, LLC

**Convened:** 8:15 a.m.

### **Committee Members/Alternates Present:**

Jan Balsom, NPS/GRCA  
Cliff Barrett, UAMPS  
Charley Bullets, Southern Paiute Consortium  
Kerry Christensen, Hualapai Tribe  
Jerry Lee Cox, Grand Canyon River Guides  
Bill Davis, CREDA  
Kurt Dongoske, Pueblo of Zuni  
Paul Harms, State of New Mexico  
Chris Harris, State of California  
Amy Heuslein, BIA  
Chris Hughes, NPS/GLCA  
Robert King, State of Utah

Glen Knowles, U.S. Bureau of Reclamation  
Ted Kowalski, State of Colorado  
Nikolai Lash, Grand Canyon Trust  
Gerald Myers, Federation of Fly Fishers  
Don Ostler, State of Wyoming  
Clayton Palmer, WAPA  
John Shields, State of Wyoming (partial, by phone)  
Pam Sponholtz, USFWS  
Larry Stevens, Grand Canyon Wildlands Council  
Bill Stewart, AGFD  
Jason Thiriot, State of Nevada  
Michael Yeatts, Hopi Tribe

### **Committee Members Absent:**

Tony H. Joe, Jr., Navajo Nation

### **Interested Persons:**

Mary Barger, USBR  
Perri Benemelis, State of Arizona  
David Bennion, WAPA  
Peter Bungart, Hualapai Tribe  
Marianne Crawford, USBR  
Kevin Dahl, Grand Canyon Trust  
Craig Ellsworth, WAPA  
Evelyn Erlandsen, State of Arizona  
Helen Fairley, USGS/GCMRC  
Lesley Fitzpatrick, USFWS  
Dave Garrett, M<sup>3</sup>Research/Science Advisors  
John Halliday, DOI  
Jayne Harkins, State of Nevada

Leslie James, CREDA  
John Jordan, Federation of Fly Fishers  
Vineetha Kartha, State of Arizona  
Ted Melis, USGS/GCMRC  
David Nimkin, GCT  
Colby Pellegrino, SNWA  
Bill Persons, USGS/GCMRC  
Tim Ricks, SNWA  
Jack Schmidt, USGS/GCMRC  
Dave Slick, Salt River Project  
Sam Spiller, USFWS  
Scott Vanderkooi, USGS/GCMRC  
Keith Waldron, USBR

**Meeting Recorder:** Linda Whetton

**Welcome and Administrative.** Shane Capron welcomed the members. He thanked GCMRC for all their hard work in presenting information at the Knowledge Assessment Workshop held the past two days.

1. Approval of the October 20, 2011, Meeting Minutes. Without objection, the minutes were approved.
2. Review of Action Items (**Attachment 1**). The following items were discussed in some detail:

Action Item 2010:03-15-16(4) Tribal Consultation Plan. John Halliday said the DOI Tribal Consultation Policy has been approved through the Office of the Secretary. Each of the bureaus and offices has 180 days from the signing of the Secretarial Order for to review their current tribal consultation policies and address any conflicts with the new policy. In answer to a question about the draft AMP Tribal Consultation Plan developed by the Hualapai Tribe, John said it was his understanding that the CRAHG and the AMWG tribal members would provide input on potential changes. He said the charge from Secretary's Designee Anne Castle was to review the Hualapai plan to ensure there are no conflicts with the DOI tribal policy. Shane said it would be important to hear from Ms. Castle on the direction she wants the program to utilize in reviewing the related documents. Kurt said the Hualapai Tribal

Consultation Plan has gone through 14 iterations over the last 11-12 years and was never finalized. He feels it is symptomatic of the program's unwillingness to deal with the tribes in an equitable manner.

**ACTION ITEM:** Shane will discuss the TWG's concerns regarding the AMP Tribal Consultation Plan with Deputy Assistant Secretary Lori Caramanian and ask whether this issue should be addressed at the next DOI/AMP tribal pre-AMWG meeting.

Action Item 2011-10-20(2) Biological Opinion. While Reclamation thought there would be an opportunity for the TWG to review the BO before it was released, Glen said FWS and DOI felt there wasn't enough time for that review. When Reclamation received the Final BO from the FWS on Dec. 23, 2011, (**Attachment 2**), they made it available to the TWG and posted it on Reclamation's website.

3. **Old Business.** The following ad hoc group updates were provided (**Attachment 3a**).

Cultural Resources AHG. The CRAHG met on January 23, 2012 in Flagstaff, and Kurt gave the following interim progress report, pending feedback from CRAHG members. He said they recognized that whatever recommendations are made, they will be significantly affected by the new DOI policy on tribal consultation Secretarial Order 3317 (**Attachment 3b**).

- The CRAHG expressed a desire that the TWG earnestly implement whatever they recommend. Many subgroups have brought back recommendations that affect policy and how this program operates, only to have them not be implemented. TWG and AMWG should have a process whereby each stakeholder could air their concerns, and could see a decision-making process of how those concerns were addressed. If that were the case, perhaps there would be less distrust around the table and less impetus to seek litigative resolution to some issues.
- The CRAHG feels TWG and AMWG should focus more time on trying to achieve consensus among the stakeholders regarding issues. One solution might be to reduce the size of meeting agendas to allow for more in-depth discussions.
- The federal agencies should be more transparent about why they are making certain decisions. They should provide their rationale to the stakeholders in general, and to tribes specifically, when federal perspectives are not being honored.
- There should be more respect for each stakeholder's perspective and position, in order to foster increased respect among stakeholders, acknowledging that some stakeholders will not have respect but should still be willing to objectively listen. Sometimes communication is not very effective because people tend to talk past each other.
- Stakeholder presentations at AMWG meetings have been very useful. These should be videotaped so that new members can be educated on the various stakeholder positions.
- Regarding how tribal values should be monitored and tracked in the program, CRAHG members are hopeful the effort begun by GCMRC to integrate traditional ecological knowledge (TEK) into their science program would be effective. In addition, river trips with tribal representatives and holding meetings in different locations that relate to the program's environmental concerns could be very beneficial.

Programmatic Agreement (PA). Glen said at the last AMWG meeting there was a consensus request from the AMWG as follows:

*To address cultural resources issues #1 and 2, below, AMWG requests Reclamation develop a timeline and process for their resolution during the meeting already scheduled for September 6-8, 2011 to discuss Section 106 and PA issues. AMWG further requests that results of that meeting be shared at the next AMWG meeting. ...*

- *AMWG recommends that the Secretary of Interior consider a review of the GCDAMP programs related to archaeological site monitoring and compliance with NHPA section 106 and the GCPA, to clarify how DOI (and the GCDAMP) is achieving compliance with both NHPA section 106 and the GCPA and what is specifically necessary to do so.*
- *AMWG recommends to the Secretary that Reclamation implement the process that has been identified in Reclamation's 2007 Treatment Plan to comply with the requirements of NHPA Section 106 for the operation of Glen Canyon Dam."*

A meeting was held on Sept. 6-8, 2011, with the AMP tribes and the other signatories to the original 1994 PA. The last day of that meeting was partially dedicated to talking about the status of the PA and Reclamation's 106 compliance, which included dam operations. Essentially, everyone agreed it made sense to pursue a new programmatic agreement to be in place for 15+ years. They agreed to a process whereby a group would create an annotated bibliography of all the background documents. Reclamation is now in the process of reviewing those documents and identifying what work remains to be done in order to craft a new programmatic agreement. Keith Waldron and Mary Barger will be assisting with NHPA compliance issues.

Memorandums of Agreement (MOAs). These are currently being prepared.

LTEMP EIS. The scoping process ended on January 31. Many comments were received and Argonne is in the process of preparing a report that should be completed by early March. There are 13 cooperating agencies and 16 tribes involved in the process. The next cooperators' meeting will be held on February 24 in Tempe.

Economist Update. GCMRC received a certification list about a month ago with six applications. The first interview is scheduled for next Monday, February 6. They hope to fill the position within this quarter.

Desired Future Conditions Update. Two meetings were held and there will be a report provided to the AMWG at its next meeting.

**4. New Business**. The next TWG Meetings will be held:

- (Mon-Tue) April 16-17, 2012 in Tempe, Arizona
- (Wed-Thu) June 20-21, 2012 in Phoenix, Arizona

Humpback Chub Five-Year Status Review. The following documents were distributed prior to the meeting:

**Attachment 4a**: Humpback Chub 5-Year Review: Summary and Evaluation

**Attachment 4b**: Discussion Paper, Western Concerns with the Humpback Chub 5-Year Status Review

**Attachment 4c**: U.S. Fish and Wildlife Service's Response to Western's concerns over the Humpback Chub 5-year Review

Pam Sponholtz gave a PPT presentation (**Attachment 4d**). She concluded by saying the program needs to look at what has been accomplished since the recovery goals came out in 2002. She said progress is being made and the five-year review is indicative of that. The review also provides a way to move forward in the next 10 years with the current BO and the LTEMP EIS.

Tom Czapla (Region 6, via phone) said that when FWS put the 2002 recovery goals together, they had very little information. In 2007, they intended to revise the recovery goals document within five years. While they continue to investigate other ways to look at populations, they were able to collect new information that indicates that the MVP calculated for pikeminnow is probably going to go up. FWS is committed to applying the best science available based on adaptive management.

Tom said, with regard to Humpback Chub, that if you look only at the past several years, the population is increasing. However, the ASMR assessment from 1989 or 1990 shows the population is in a decline. This is the major difference between the FWS and Western's assessment. He also felt the FWS was a bit naïve in the initial goals when they wrote the population must continually increase, because populations vary, so they are considering a change to that language.

A stakeholder noted that downlisting or de-listing of a species depends on the population status throughout the basin, and asked how the FWS will address that issue if the population in Grand Canyon does well and the Upper Basin population does not. He felt there is pressure to spend money in the Grand Canyon and it was unreasonable. He asked if anything could be done. Pam said that the situation as described makes the Grand Canyon population all the more important. She said the FWS is conservative and highly protective of it because it is the strongest population. The Upper Basin needs more time to work on recovering their populations, but the reason for having recovery units in the Lower Basin and the Upper Basin is for redundancy. If the Upper Basin populations are doing so poorly, it is a positive that the population in Grand Canyon is doing so well, to protect against extinction on a basin-wide scale.

In response to a question about the FWS concept of generations within their criteria, Tom said that while the fish can live to be more than 30 years old, a generation was about eight years: the five-year period to downlist and the subsequent three-year period reflect this. He noted that humans, we can live to be 80-100 years old, but we consider a generation approximately 20 years.

Stakeholders made comments that the Grand Canyon chub are doing well because the dam is protecting them, and that, unlike the upper basin chub, they have an assured water supply.

**FY2013-14 Biennial Budget & Workplan Discussion, and EA/Biological Opinion Discussion.** Shane referenced the GCDAMP Biennial Process that was approved by the AMWG on May 6, 2010 (**Attachment 5a**). He reviewed the timeline for completing budget assignments (**Attachment 5b**). He encouraged people to read the Annual Reporting document from GCMRC as a basis for what work was done in FY11; he felt this was a good starting point for understanding what will happen in FY12.

**Bureau of Reclamation Budget Development.** Glen said the two EAs (**Attachment 5c** = executive summaries from each document) were finalized at the end of December. Reclamation received the Biological Opinion from the FWS on December 23, 2011. The BiOp defined the non-native fish control actions, and those actions will have an impact on the 2013 budget. There has not been a lot of sediment input so conducting an HFE in 2012, should the HFE Protocol be finalized with a FONSI, is unlikely. However, an HFE science plan exists that relies on existing monitoring programs to monitor HFEs. He provided excerpts from the BiOp (**Attachment 5d**) and said there are two zones in the river where they would remove live trout, in the reach from the Paria River to Badger Creek (PBR) and around the mouth of the Little Colorado River (LCR). The proposal is to initially do two trips in the PBR reach, pending a decision document (FONSI). Based on the outcome of those trips, Reclamation may pursue additional removal in the PBR. He noted these actions would be experimental, because no one knows how effective live removal in that reach would be. Removal in the LCR would occur only if the trigger, as defined in the Final BiOp, were met.

In response to a stakeholder concern about the impact to the budget from these two EAs, Shane noted that there could be \$600,000 in the Experimental Flow Fund and carryover funding. TWG members could make a recommendation regarding what they want Reclamation to do with those funds.

In answer to a question regarding whether Reclamation had considered a risk assessment to tease out the predation effect from temperature effect, Glen said Reclamation wanted this action to be as flexible as possible and useful in terms of adaptive management and learning more about the effect of non-native fish on humpback chub. Reclamation feels that the triggering concept allows for this while being protective of the humpback chub. He noted that this is the start of this approach in terms of understanding the predation effects through adaptive management and although temperature is a variable that cannot be controlled, if we were to get colder water this year and in future years this may be a serendipitous experiment to also examine temperature effects contrasted against the warmer water of recent years.

GCMRC Budget Discussion. Jack Schmidt said he's committed to developing the FY 2013-14 budget with an eye towards providing the best science support the Center can offer and identifying the items in the budget that are able to be tracked. In that regard, he and his staff want to work with the stakeholders in answering their questions so they can develop a common understanding of all the issues and related project costs. He gave a PPT presentation (**Attachment 5e**) that focused on the GCMRC's expenses for FY11 and spending in the various program areas in FY12, and explained how their science plan would be linked to activities for the NNFC EA and the HFE EA. His conclusion was that 65% of the expected biology budget for FY12 is work accomplished for the EAs and BiOps, though some of that was costs of ongoing monitoring and experiments.

**ACTION ITEM.** The TWG will send comments on the FY2013-14 budget to Linda ([lwheaton@usbr.gov](mailto:lwheaton@usbr.gov)) by COB February 8, 2012. These will be synthesized and sent to the BAHG on February 9 for further discussion during the February 14 BAHG conference call.

A stakeholder noted that he wished more time could have been devoted to hear the stakeholders' budgetary concerns, and that tribal members would prefer to speak over sending an email. By conducting business in this manner, their input is unintentionally marginalized. Shane said there would be more time devoted to discuss budget issues in future meetings and he suggested possibly having other BAHG meetings for in-depth discussions. [Later, the process was changed to allow two rounds of comments, so TWG members could comment on others' concerns; and to allow for phone calls to tribal members in case they would prefer to dictate their concerns to writing them in an email.]

SEAHG Report. Shane referred to the AMWG's charge to the TWG from August 2010:

*The AMWG supports implementation of studies to further our understanding of the socioeconomics of adaptive management decisions within the GCDAMP; this includes and is not limited to market, non-market, and non-use studies. Thus, the AMWG directs TWG to further develop an economics implementation plan to be provided to AMWG at its next meeting for possible implementation starting in FY 2012. That implementation plan will include the following components:*

- *Information needs associated with each study or analysis and the prioritization of those needs,*
- *Scope and costs associated with each project and potential funding sources,*
- *A description of how the information would be useful to the program, and*
- *A more thorough review of the economics panel report.*

Dave Garrett, chair of the Socioeconomics Ad Hoc Group (SEAHG), gave a PPT presentation (**Attachment 6**). He said the SEAHG is proposing a robust socioeconomic program, starting with market-related aspects of power, water, recreation, and cultural resources. The program then moves to non-market related aspects of all of those resources, and then non-use aspect. The recommendation includes the move into core monitoring and a decision tool, and it recommends workshops to focus on high-cost areas. He noted that the SEAHG had prioritization work to complete. He said similar work is being done by NPS, AGFD, and WAPA, so there are opportunities for partnering which may reduce costs to the AMP.

While there is more work to be done on the SEAHG Plan, Shane said he felt it is ready to be moved to the Secretary. He continued that it is important for the Secretary to give feedback on the purview of this program versus other programs, and provide direction on how much of the program will be accomplished through the LTEMP EIS. He noted that round two would begin when the new GCMRC economist is on board and could help work through the details.

Comments made by stakeholders included:

- Funding for outyears is a concern, in light of the AMP being directed by two EAs and particularly incorporating a lot of GCMRC's time and energy to understand sediment transport and distribution.
- We need the Department to indicate the importance of socioeconomics and how the information will be used.
- There is a need for the GCMRC economist and SEAHG to work closely together.
- TWG's purview is to determine what is important in developing the budget.
- We need better understanding of the ecosystem using models.
- We need to have good production functions or economics does not work very effectively.
- We need to sort through the non-use issues.

**Motion:** (Proposed by Cliff Barrett, seconded by Larry Stevens)

**The TWG recommends that the AMWG recommend the Socioeconomic Ad Hoc Group report to the Secretary of the Interior for consideration.**

**TWG further recommends that, upon consideration by the Secretary and guidance from him regarding the role of the program in implementing socioeconomics studies, the AMWG directs TWG to work with GCMRC to develop a workplan for this program.**

**Further, the TWG recommends that the SEAHG continue to provide, develop, and recommend information to the TWG regarding implementation of the Socioeconomic Program, including costs and timing of the Program Elements; and work with AMP stakeholders who will be conducting socioeconomic analyses in other forums to enhance collaboration to fulfill Information Needs.**

**Hearing no objection, the motion was passed by consensus.**

**FY2013 Hydrograph**. In discussing the process for developing a 2013 hydrograph, Glen referred to the FY2012 hydrograph that was passed by the AMWG at its last meeting (**Attachment 7**). Reclamation's thinking is that there has not been an opportunity to fully assess the 2012 hydrograph because of equalization releases carried over from last year and the fact that we are still in the first quarter of the FY 2012 hydrograph. However, the targeted approach of the FY 2012 hydrograph recommended by AMWG in August was based on a robust analysis by Reclamation and collaborating agencies, and so

Reclamation anticipates this would continue to be the recommended hydrograph for 2013 barring any new contradictory information. Dave Trueman will involve the TWG as he initiates the FY2013 hydrograph development process.

**FY 2013 Flow Considerations for FY2012 and Beyond.** Craig Ellsworth said he has been working with endangered fish and is currently assigned to the WAPA office in Salt Lake City. He distributed copies of "A Research and Monitoring Plan for Evaluating Trout Management Flows Below Glen Canyon Dam" and gave a PPT presentation (**Attachment 8**). He explained that the purpose of implementing trout management flows is to evaluate methods for using releases from GCD to reduce the production of large numbers of age-0 RBT, in order to improve the quality of the Lees Ferry trout fishery and conserve the endangered humpback chub and other native fishes in Grand Canyon. This science plan describes how to determine whether releases from GCD can be used to manipulate the age and size structure of the RBT fishery at Lees Ferry. The report identifies three objectives that need to be addressed to support management decision-making:

- Sustain a healthy Lees Ferry trout population with a balanced age and size structure;
- Reduce annual production rates of rainbow trout in the Lees Ferry reach; and
- Reduce emigration rates of RBT from Lees Ferry to downstream reaches occupied by HBC.

To determine the effect of a trout management flow on either the RBT population at Lees Ferry or the HBC population in the Grand Canyon, these experiments need to be applied for a duration that approaches or exceeds the generation time for the two fish populations of interest (3-5 years for RBT and 4-6 years for HBC). Alternatively, inferences regarding the impact of trout management flows could be made using data on how the treatments affect the growth and/or survival of younger life stages as long as any density dependent responses are taken into account. Regardless of which approach is taken to reduce uncertainty, variation in environmental factors can complicate interpretation of results. He said that the local fishing communities need to be involved, and tribal values needed to be incorporated.

Shane said the BiOp asks the plan be developed in two years. He has talked with Glen and believes there is agreement to develop an ad hoc group, develop the plan, have it reviewed by the TWG and AMWG, and then be recommended to the Secretary. Glen said the NPS is already embarking on an effort to create a fisheries management plan and wants to be respectful of that effort.

Presentation by Federation of Fly Fishers. John Jordan said he and Jerry Myers are the recreational interests on the TWG and AMWG. While they have been appointed by the Federation of Fly Fishers (FFF) and work closely with them, they are equally close to Trout Unlimited and other fishing clubs and interests within the state. Along with other organizations, he said Trout Unlimited has evolved over the past 10 years and is interested in conservation measures that relate to native fish in all areas. Even though the FFF represents recreational fishing, they have a strong interest in both native and non-native issues.

The FFF is pleased to see acknowledgement that the Lees Ferry fishery should be a blue ribbon fishery, and not solely a naturally reproducing recreational fishery. He also noted the acknowledgement that the cold clear water section of the river is suitable for trout and no longer suitable for native fish, while the balance of the river, including the tributaries, is suitable and designated for native fish. He said the angling community recognizes that native fish are in a precarious position and should have a strong, independent focus in this whole system.

John said he was encouraged that the program is talking about trout *management* flows instead of trout *suppression* flows. He reminded the group that Marble Canyon is socioeconomically dependent upon

Lees Ferry fishing, including guides, lodges, and restaurants. The Navajo community also relies heavily on angling as a source of funding.

As the fishery has declined, largely through neglect of its blue ribbon status, all the businesses suffered significant losses. Returning it to blue ribbon status would benefit the fish and the community. As the FFF began to develop a comprehensive fishery management plan to achieve this goal, they discovered that GRCA and GLNRA are preparing fisheries management plans. NPS is encouraging participation by the angling community and FFF will support their efforts. Their goal is to be a contributing participant to help bring the process together.

Chris Hughes said NPS has an aggressive schedule to complete a draft of their fisheries management plan by the end of 2012. Jan added that it is very important for the NPS to collaborate with other groups. They will initiate formal scoping in late March.

In determining the charge for a new ad hoc group, Shane read from the BiOp (page 108), "Reclamation has committed to develop, with the GCDAMP and stakeholder involvement, additional non-native fish control options during the first two years of the proposed action to reduce recruitment of non-native rainbow trout at, and emigration of those fish from, Lees Ferry." He said it was reasonable for Reclamation to ask TWG to develop an ad hoc group to produce the options for Interior to consider.

There was no objection to establishing an ad hoc group, but Shane said that would be accomplished at the April TWG meeting.

**Public Comments:** None

**Management of TWG Meetings.** Mary said she and Shane had discussed ways to improve the management of TWG meetings. They thought giving TWG members the opportunity for a brief meeting evaluation at the end of each meeting would help them improve future meetings. She suggested that everyone could share one thing they liked about the meeting and offer a suggestion for improving future meetings. The group indicated they were not interested in doing a meeting evaluation, and so it was not done.

**Follow-up on GCMRC Role in the GCDAMP.** Jack Schmidt said he wanted to provide more information on what he perceived was GCMRC's role in the program. He thinks the job of GCMRC is not just to react to what the TWG tells them or requests of them, but also to be at least three steps ahead of the group and aware of the science that informs the group. As such, he has implemented the following at GCMRC:

- **Applied River Research Group.** This team of Ph.D. scientists (David Topping, Paul Grams, Ted Kennedy, etc.) will focus on publishing, innovation, and making sure they work in a peer-reviewed framework. Dr. Ted Melis will head this group with an eye towards productivity and innovation, breaking the dependence on the AMP for funding support, and thinking about work with other rivers.
- **Adaptive Management Team.** This group (Helen Fairley, Scott Vanderkooi, Ted Melis, Jack Schmidt) will meet weekly to address the needs of the GCDAMP stakeholders and other agencies. They will serve as the point of contact for following up with the scientists and getting status updates on projects. Barbara Ralston will also assist the group as needed.

He said he was doing everything he could to allow his staff as much time to do their work as possible, while still being able to respond to TWG requests.

**Adjourned:** 2:55 p.m.

**Attachment 9:** Meeting Notes from Budget AHG Conference Call held Feb. 14, 2012.

Respectfully submitted,

Linda Whetton  
Upper Colorado Region  
U.S. Bureau of Reclamation

### General Key to Adaptive Management Program Acronyms

ADWR – Arizona Dept. of Water Resources	INs – Information Needs
AF – Acre Feet	KA – Knowledge Assessment (workshop)
AGFD – Arizona Game and Fish Department	KAS – Kanab ambersnail (endangered native snail)
AIF – Agenda Information Form	LCR – Little Colorado River
AMP – Adaptive Management Program	LRMCP – Lower Colorado River Multi-Species Conservation Program
AMWG – Adaptive Management Work Group	LTEP – Long Term Experimental Plan
AOP – Annual Operating Plan	LTEMP – Long-Term Experimental and Management Plan
BA – Biological Assessment	MAF – Million Acre Feet
BAHG – Budget Ad Hoc Group	MA – Management Action
BCOM – Biological Conservation Measure	MATA – Multi-Attribute Trade-Off Analysis
BE – Biological Evaluation	MLFF – Modified Low Fluctuating Flow
BHBF – Beach/Habitat-Building Flow	MO – Management Objective
BHMF – Beach/Habitat Maintenance Flow	MRP – Monitoring and Research Plan
BHTF – Beach/Habitat Test Flow	NAU – Northern Arizona University (Flagstaff, AZ)
BIA – Bureau of Indian Affairs	NEPA – National Environmental Policy Act
BO – Biological Opinion	NHPA – National Historic Preservation Act
BOR – Bureau of Reclamation	NPS – National Park Service
CAHG – Charter Ad Hoc Group	NRC – National Research Council
CAPA – Central Arizona Project Association	O&M – Operations & Maintenance (USBR funding)
GCT – Grand Canyon Trust	PA – Programmatic Agreement
CESU – Cooperative Ecosystems Studies Unit	PEP – Protocol Evaluation Panel
cfs – cubic feet per second	POAHG – Public Outreach Ad Hoc Group
CMINs – Core Monitoring Information Needs	Powerplant Capacity = 31,000 cfs
CRBC – Colorado River Board of California	R&D – Research and Development
CRAHG – Cultural Resources Ad Hoc Group	RBT – Rainbow Trout
CRCN – Colorado River Commission of Nevada	RFP – Request For Proposals
CRE – Colorado River Ecosystem	RINs – Research Information Needs
CREDA – Colorado River Energy Distributors Assn.	ROD Flows – Record of Decision Flows
CRSP – Colorado River Storage Project	RPA – Reasonable and Prudent Alternative
DAHG2 – Desired Future Conditions Ad Hoc Group	SA – Science Advisors
DASA – Data Acquisition, Storage and Analysis	Secretary – Secretary of the Interior
CWCB – Colorado Water Conservation Board	SCORE – State of the Colorado River Ecosystem
DBMS – Data Base Management System	SHPO – State Historic Preservation Office(r)
DOE – Department of Energy	SOW – Scope of Work
DOI – Department of the Interior	SPAHG – Strategic Plan Ad Hoc Group
DOIFF – Department of the Interior Federal Family	SPG – Science Planning Group
EA – Environmental Assessment	SSQs – Strategic Science Questions
EIS – Environmental Impact Statement	SWCA – Steven W. Carothers Associates
ESA – Endangered Species Act	TCD – Temperature Control Device
FACA – Federal Advisory Committee Act	TCP – Traditional Cultural Property
FEIS – Final Environmental Impact Statement	TES – Threatened and Endangered Species
FRN – Federal Register Notice	TMC – Taxa of Management Concern
FWS – United States Fish & Wildlife Service	TWG – Technical Work Group
FY – Fiscal Year (October 1 – September 30)	UCRC – Upper Colorado River Commission
GCD – Glen Canyon Dam	UDWR – Utah Division of Water Resources
GCT – Grand Canyon Trust	USBR – United States Bureau of Reclamation
GCMRC – Grand Canyon Monitoring & Research Center	USFWS – United States Fish & Wildlife Service
GCNP – Grand Canyon National Park	USGS – United States Geological Survey
GCNRA – Glen Canyon National Recreation Area	WAPA – Western Area Power Administration
GCPA – Grand Canyon Protection Act	WY – Water Year (a calendar year)
GLCA – Glen Canyon National Recreation Area	
GRCA – Grand Canyon National Park	
GCRG – Grand Canyon River Guides	
GCWC – Grand Canyon Wildlands Council	
HBC – Humpback Chub (endangered native fish)	
HMF – Habitat Maintenance Flow	
HPP – Historic Preservation Plan	

Updated: Sept. 1, 2011