

**Glen Canyon Dam Adaptive Management Work Group Meeting
February 9-10, 2011**

Conducting: Anne Castle, Secretary's Designee

Start Time: 9:40 a.m.

Facilitator: Mary Orton

Committee Members/Alternates:

Perri Benemelis, AZ Dept. of Water Resources
Charley Bullets, Southern Paiute Consortium
George Caan, Colorado River Commission/Nevada
Alan Downer, Navajo Nation
Ann Gold, U.S. Bureau of Reclamation
Martha Hahn, NPS/GRCA
Amy Heuslein, Bureau of Indian Affairs
Loretta Jackson-Kelly, Hualapai Tribe
Leslie James, CREDA
Sam Jansen, Grand Canyon River Guides
John Jordan, Federation of Fly Fishers
Ted Kowalski, Colorado Water Conservation Board

Arden Kucate, Pueblo of Zuni
Leigh Kuwanwisiwma, Hopi Tribe
LaVerne Kyriss, Western Area Power Admin.
Nikolai Lash, Grand Canyon Trust
Estevan López, NM Interstate Stream Commission
Ted Rampton, UAMPS
Mike Senn, Arizona Game and Fish Dept.
John Shields, Wyoming State Engineer's Office
Sam Spiller, U.S. Fish and Wildlife Service
Larry Stevens, Grand Canyon Wildlands Council
Dennis Strong, Utah Div. of Water Resources

Committee Members Absent:

Jennifer Gimbel, Colo. Water Conservation Board

Jerry Zimmerman, Colo. River Board of California

Interested Persons:

Deanna Archuleta, DOI
Jan Balsom, NPS/GRCA
Debra Bills, USFWS
Shane Capron, WAPA/TWG Chair
Lori Caramanian, DOI
Chuck Cullom, CAP
Jerry Cox, Grand Canyon River Guides
Kevin Dahl, NPCA
Mary Daugherty, USGS/GCMRC
Kurt Dongoske, Pueblo of Zuni
Helen Fairley, USGS/GCMRC
Dr. Dave Garrett, M3Research
Paul Grams, USGS/GCMRC
J. Lonnie Gourley, USBR/Glen Canyon Dam
John Halliday, DOI
John Hamill, USGS/GCMRC
Lynn Hamilton, Grand Canyon River Guides
Beverly Heffernan, U.S. Bureau of Reclamation
Norm Henderson, National Park Service
Jack Houck, member of the public
Bill Jackson, NPS
Tony Joe, Navajo Nation
Lisa Iams, U.S. Bureau of Reclamation
Robert Jenkins, GCRG Board Member/Hopi Tribe

Lynn Johnson, DOI Solicitor's Office
Robert King, Utah Division of Water Resources
Kate Kitchell, USGS/SBSC
Glen Knowles, U.S. Bureau of Reclamation
Dennis Kubly, U.S. Bureau of Reclamation
Jane Lyder, DOI/Fish, Wildlife, and Parks
Barbara McKenzie, USGS/GCMRC
Ted Melis, USGS/GCMRC
Gerald Myers, White Mountain Fly Fishing Club
David Nimkin, National Parks Conservation Assoc.
Mary Orton, The Mary Orton Company
Don Ostler, Upper Colorado River Commission
Clayton Palmer, Western Area Power Admin.
Heather Patno, U.S. Bureau of Reclamation
Colby Pellegrino, Southern Nevada Water Authority
Pam Sponholtz, USFWS
Bill Swan, Imperial Irrigation District
Jason Thiriot, Colo. River Commission/Nevada
John Weisheit, Living Rivers
Barry Wirth, U.S. Bureau of Reclamation
Jeffrey Woner, CREDA
Mike Yeatts, Hopi Tribe
Willard Zunie, Pueblo of Zuni

Recorder: Linda Whetton, USBR

Welcome and Administrative. Ms. Castle welcomed everyone to the meeting. A quorum was established. Ms. Castle urged the members to submit their nomination and reappointment materials as early as possible, and stressed the importance of having alternates approved to ensure each entity will be able to vote at AMWG meetings. She noted that Larry Stevens and Charley Bullets (members) were recently reappointed to the AMWG, along with the following alternates: Ted Kowalski (Colorado), Robert King (Utah), Rick Johnson (GCT), and Pam Sponholtz (USFWS).

Approval of the August 24-25, 2010, Meeting Minutes. Mr. Shields moved to approve the notes as distributed and Mr. Stevens seconded the motion. The minutes were approved by consensus.

Action Item Tracking Report. Ms. Castle said this was an informational document (**Attachment 1**) and asked if there were any questions.

Legislative Update. Mr. Knowles said the tenor in Congress is one of increased scrutiny of federal budgets and the AMP will certainly face increased challenges.

Litigation Update. Ms. Johnson reported on litigation, ongoing since 2007, between Grand Canyon Trust and the Department of the Interior. Activity since the last AMWG meeting involved the 2010 deferral of non-native fish removal. The Trust has requested the court vacate some of its earlier decisions, other ESA questions are before the court, and no rulings of substance have occurred.

Long-term Budget Discussion. Ms. Castle said she is concerned that the AMWG spends too much time in budget minutia and not enough on budget policy. She wants the TWG to raise only significant policy issues to the AMWG. She said the DOI agencies have committed they will resolve internal Interior budget issues before they go to the TWG. This will require the TWG and TWG Chair to decide what issues get elevated to the AMWG, and AMWG to defer to TWG decisions. .

HBC Comprehensive Plan Ad Hoc Group. Ms. Castle noted that no one had volunteered to chair this Ad Hoc Group. She suggested that it might no longer be needed, as the efforts will be folded into the long-term experimental and management plan. Some stakeholders felt that the group might be needed. Ms. Castle tabled further discussion until tomorrow with the possibility of reconstituting the group.

Recruitment of the GCMRC Chief. Ms. Kate Kitchell gave a PPT presentation (**Attachment 2**) on the status and outlook for filling this critical position. The vacancy announcement closed the end of January; she will be inviting AMWG members and Science Advisors to participate in the hiring process. She hopes to have the new chief in place by April.

Ms. Castle said GCMRC is in the midst of updating its five-year science plan. She said there is a large degree of consensus by the AMWG that the program is at a critical point to pivot from more purely experimental science into more science support for management of dam operations. Ms. Castle said President Obama has announced budgets will be frozen for the next five years. Therefore, she has asked GCMRC to focus on the desired future conditions (DFCs) as a starting point to inform the budget, using the following four priorities: first, protection and recovery of humpback chub; second, sediment in the Grand Canyon and its importance to so many resources; third, non-native fish control, and fourth, recreational fish trout fishery. The latter two relate and work at odds to each other. She said these four priorities are consistent with the goals developed by the AMWG in 2004. While these priorities do not necessarily mean that experimentation and research will be done on all four priorities, by setting the priorities the program will avoid the "Christmas tree approach."

Members made the following comments: 1) consider the priority of ecosystem management and competing factors, 2) tribal knowledge needs to be incorporated into the science planning process, including involvement with the tribes, 3) include traditional ecological knowledge, and 4) pay close attention to all the functions in multiple trophic levels.

Charter Ad Hoc Group (CAHG) Report. (**Attachment 3** = AIF and PPT) Ms. Castle said Jennifer Gimbel and Ann Gold did a wonderful job on the CAHG and there was a good cross-section of participating AMWG members. Ms. Gold presented the recommendations from the CAHG for changes to the AMWG operating procedures, and said the CAHG focused on the following issues: 1) Composition of the membership of the AMWG, 2) Inclusion of the DOI bureaus as voting members on the AMWG, 3) Establishment of the position of executive director for the AMWG and the source of associated funding, 4) Procedure for approval of TWG members and alternates and subgroup and ad hoc group members, and 5) Voting procedures of the AMWG (consensus, majority vote, super-majority, minority reports, etc.).

Ms. Castle thanked the CAHG for their work. She thought the survey and the U.S. Institute for Environmental Conflict Resolution (USIECR) report were extraordinarily helpful in assisting DOI to identify issues on which they would like advice, consultation, and recommendations from the AMWG. Should the AMWG wish to recommend a change to the charter, they would not need to wait until its expiration in July 2012. However, the proposed revised charter would be reviewed by DOI solicitors

and GSA for adherence to FACA guidelines. She said she felt the AMWG has been able to achieve a lot and has moved forward very significantly by consensus. She asked if the CAHG should be continued. Ms. Gold said the group did not discuss that and offered that another group could be formulated to look at the specific issues raised by the CAHG.

The group discussed the CAHG recommendation that the DOI bureau representatives become ex-officio, non-voting members, and whether the CAHG should be the body to evaluate the idea following the trial period. Speaking as a DOI representative, Ms. Castle said the DOI agencies understand the need for their active participation, and they would make that commitment to the AMWG.

Proposed motion by George Caan, seconded by Dennis Strong: AMWG recommends that the Secretary of the Interior adopt the changes to the AMWG Charter as attached in the draft dated February 9, 2011, and AMWG adopts the changes to the operating procedures as attached in the draft dated February 9, 2011.

Members and the facilitator noted the following concerns: 1) by pulling the DOI agencies out of the voting process, certain balancing interests are removed, 2) without the DOI agencies as voting members, is there still an adequate dynamic and adequate representation of the interests to ensure good decisions are being made, 3) concern about Indian trust responsibilities with DOI agencies, 4) business owners and community interests are vital to the GCDAMP, 5) this is a FACA group with other interests represented who don't have a direct line of communication to the Secretary of the Interior, 6) local businesses, lodges, hotels, and restaurants are being impacted by how decisions are made by the AMWG/Department, 7) evaluate whether businesses and/or local governments from Coconino County should be represented on the AMWG, 8) members should make sure they make their comments during discussion and not wait to be asked for the reasons for their votes, and 9) it need to be clear whether DOI agencies are counted for the quorum determination.

After discussion, the motion was revised as follows:

Revised/combined Motion: AMWG recommends that the Secretary of the Interior adopt the changes to the AMWG Charter and operating procedures as attached in the draft dated February 9, 2011, and requests that the CAHG review the level of participation of the DOI agencies approximately 18 months after the institution of the new Charter and make a recommendation to the AMWG as to whether the ex-officio nature of their involvement should continue.

The group took a break to allow tribal representatives to caucus on the proposed motion. Upon their return, Ms. Castle said the tribal representatives had requested additional time; therefore, she tabled further discussion until the next morning.

GCMRC Updates (**Attachment 4** = AIF)

High Flow Experiment Synthesis Reports. Dr. Ted Melis distributed copies of the USGS report, "Effects of Three High-Flow Experiments on the Colorado River Ecosystem Downstream from Glen Canyon Dam, Arizona, Circular 1366" (**Attachment 4a**) and a Fact Sheet (**Attachment 4b**) that was an executive summary of the report. He also distributed copies of a companion Fact Sheet, "The Effects of Glen Canyon Dam Operations on Early Life Stages of Rainbow Trout in the Colorado River" (**Attachment 4c**). He gave a PPT presentation, "The High Flow Experimental Results, 1996, 2004 & 2008" (**Attachment 4d**). He stated the driving assumption held by the authors is that resource managers generally desire more and larger sandbars. He presented data on the sediment responses, biological resources, studying future responses, and HFE triggering concepts and options. He advised the group to read chapter 4 for information on the riparian results.

Uncertainties remain and it is unknown whether the suggested triggering option for long-term experimentation can rebuild and maintain sandbars at desired levels. In addition, desired conditions

remain unclear. If monitoring under the suggested triggering strategy indicates that sandbars continue to erode, or cannot be rebuilt and sustained at a desired level, then decision makers may choose other experimental options such as further constraining dam releases, augmenting sand supply to Grand Canyon from sources in Lake Powell, or both. Monitoring the status and response of the aquatic food web and fish population to HFEs is critical.

FY11 Workplan. (**Attachment 4e** = PPT). Mr. John Hamill said several unplanned activities/events have impacted implementation of the FY11 workplan. The next steps are to review budget impacts of HFE and non-native fish control science planned for FY11 and FY12. A potential spring 2011 HFE may also impact certain workplan items.

Sediment Update. Dr. Paul Grams presented a PPT, "Update on 2010 and 2011 Sand Input and Sand Mass Balance" (**Attachment 4f**). He concluded with the following results:

- There were above average sand inputs in July through October 2010.
 - As of January 7, 2011, most of those inputs were still in upper Marble Canyon (above RM 30).
- October 15, 2010 to January 7, 2011 (2 weeks of steady 8,000 cfs and 2 months of 10,000-16,000 cfs fluctuations):
 - Was a period of sand loss from RM 0 to 87 (about 300,000 tons of sand was transported out of upper Marble Canyon).
 - Sand loss was partially offset by late December Paria River inputs (~350,000 tons of new sand in upper Marble Canyon).
- Turbidity in Marble Canyon has been relatively high.
- Winter fluctuating flows (currently 13,000 to 20,000 cfs) will accelerate rate of sand export.

Mr. Jordan said he would like to have assurance that the decision to do sequential high flow experiments will be determined by the balance of available science, and not by a policy decision or a decision separate from the amount of sand that is available. Ms. Castle said that an HFE would only occur if there were a positive sand balance; she assured him there would be more discussion before a decision is made.

Basin Hydrology and Operations. (**Attachment 5** = AIF and PPT) Ms. Heather Patno presented on conditions in the Upper Basin. She said that in 2005, there was 125% of average around this same time of year; this is tracking fairly closely with current conditions. The runoff in April-July was 8.84 maf; now, the forecast center is predicting nine-maf inflow. Lake Powell is 56% full at 13.7 maf. The final forecast for February and the coordination between Lake Mead and Lake Powell could not be finalized before the meeting, so she used January forecast values. She reported reservoirs are generally full, and provided information on the Glen Canyon Dam Power Plant unit schedule for water year 2011.

High Flow Experiment Protocol Environmental Assessment. (**Attachment 6** = AIF) Mr. Dennis Kubly presented a PPT (**Attachment 6a**) and said the HFE protocol is being developed to establish a set of guidelines that will enable the GCDAMP to conduct experimental dam releases on a multi-year, multi-experiment basis, while reducing the time and expense of compliance activities. The intent of the experiment is to improve learning that will lead to improved fine sediment conservation and benefit resources that depend on sediment: sandbars, camping beaches, and nearshore habitat for native fish. The EA will also analyze the effect of conducting high flow experiments on other natural resources, hydropower production, and recreation. If a decision were made to conduct an HFE, GCMRC and other cooperating scientists would conduct a scientific investigation following a previously agreed-upon science plan. He said the public review comment period was extended until February 28, 2011.

Ms. Castle said the Department is considering modifications to the proposed action to incorporate comments received. If the proposed action were modified, the EA would be re-circulated for further comment and discussion.

GCMRC Plan for High Flow Experimental Protocol. Mr. John Hamill presented a PPT, “General Monitoring and Research Plan for High Flow Experimental Protocol” (**Attachment 6b**). The science plan is focused on assessing the effects of the “store and release approach” described in the EA. A separate science plan could be developed to assess the effects of the “rapid response approach” described in the EA, once the details of that approach are more fully described. The plan was transmitted to the Science Advisors with a request to have comments by February 18. The plan may be revised based on those comments and other changes that might be made to the proposed action.

Report on Tribal Consultations. Mr. John Halliday said meeting with the tribal councils over the past few months has been a great learning opportunity. Having met with the various tribal councils, he believes all relationships with people, animals, and the resources are intertwined. One of the concerns expressed by the tribes was including their traditional cultural knowledge into scientific reports. The tribes have knowledge of the land that may not be scientifically proven, but their knowledge spans thousands of years and they want to share that information. The tribes feel there should be a protocol in place to prepare them for any GCDAMP activities that may disrupt their operations, river trips, and businesses. The Grand Canyon is a sacred site and the tribes would like as little disturbance as possible in the Canyon. He also reported that the tribes fear the flooding will impact traditional cultural properties. The tribes want to continue the consultation process. He said Ms. Castle sent a letter dated Nov. 30, 2010, requesting consultation with the tribes. Consultation has occurred with all the tribes who requested that consultation. Concerns expressed during that consultation were forwarded through the chain of command and discussed with Reclamation and other federal agencies. Federal agencies were invited to attend consultation meetings with the tribes. Thus far, meetings have been held with the Hualapai Tribe, the Kaibab Band of Paiute Indians, Pueblo of Zuni, the Hopi Tribe, the Paiute Tribe of Southern Utah, and the Navajo Nation. The Las Vegas and Moapa tribes indicated they did not have any issues and did not require consultation.

During Q&A, the following points were made:

- The timeframe of the HFE Protocol EA will not allow for a spring 2011 HFE. (Castle)
- The impact of high flow experiments on the nearshore ecology project: There is a continuing need to monitor the juvenile fish in the mainstem. This is the easiest way we can assess effects of an HFE in the short-term; also, if trout are preying upon chub, they will prey on those young fish. The next phase of the nearshore project should shift from the mainstem to the Little Colorado River, to promote better understanding of the LCR’s role in the overall life history of humpback chub. (Hamill)
- How will we test how fast sandbars disappear based on the subsequent flow regime? A: Recent reports highlight the impact of post-HFE flows on erosion. We decided not to address the “intervening flows” in this EA because the flow regimes were the subject of the 1995 EIS, through which the MLFF flow regime was selected. We committed that intervening flows and overall flow regimes will be looked on as part of the long-term experimental and management plan. (Castle)
- How much did the fact that tamarisk germinates at the time of the May/June normal pre-dam flow event factor into developing the timing scenarios? Have you thought about how the beetle may eliminate tamarisk germination or tamarisk establishment in that system from now on? A: The approach was to optimize sediment and habitation and then look for impacts on the resources. With the LTEMP, we will see the changes that would occur and they would be considered in that investigation. (Kubly)
- The Pueblo of Zuni looks at the Grand Canyon and the Colorado River as a traditional cultural property; we are concerned that these repeated high flows will have an adverse impact on the registered eligibility property. How would you mitigate the adverse effect? A: I do not have a good answer so let us know your thoughts and we can address them. (Kubly)
- Will there be some form of an MOA with the tribes for resolving adverse effects? A: In the next few days, we will be sending the consultation letters to the SHPOs and THPOs, including the effects determinations. We do have adverse affect determinations, and the SHPOs and THPOs have 30 days to agree with that. While that process is going on, we intend to follow up with MOAs to those effects. We will be looking to John Halliday to help schedule the appropriate tribal and cultural meetings. (Heffernan)
- Zuni submitted a national register nomination form for the Grand Canyon as a traditional cultural property. A resolution by the Zuni Tribal Council was submitted to Reclamation regarding the tribe’s position on the eligibility of the Grand Canyon from rim-to-rim, the Zuni TCP, which is not in the HFE draft EA. Zuni is also concerned about high flows affecting cultural sites.

- The non-native EA and the HFE EA are inextricably linked, and appropriate monitoring and timely reporting will be a fundamental element of the success of these efforts. How will the agencies ensure there are not problems with budgetary or permitting issues? A: We are committed to resolving permitting issues within the federal agencies. (Castle)
- Is a science plan required for the rapid response approach, due to the fact that it is mentioned in the EA? A: The EA called for a science plan but we do not know the parameters of the approach. Once safety, logistical, and practical issues are resolved, and we know more about the approach, we will see what type of science plan would be appropriate.

Ms. Castle noted that tribal consultation will continue, and Reclamation and other agencies will consider mitigation measures. All comments received will be carefully reviewed. The designation of the entire Canyon as a traditional cultural property would involve consideration of the overall beneficial impacts of high flow experiment. Whether there is a net benefit is an issue to be addressed in further consultation. Given the magnitude and importance of comments received on the HFE Protocol EA, the federal agencies are looking at modification of the proposed action. Therefore, the Department has concluded that the possibility of a Spring HFE is very slim. She removed the "Potential Spring 2011 High Flow Experiment" item from the agenda.

TWG Chair Report

Fall Steady Flow Plan. Mr. Shane Capron presented a PPT, "Fall Steady Experimental Flow Plan TWG Review and Recommendation" (**Attachment 7a**). He reviewed the need for fall steady flows from a report prepared by Stone and Gorman: "It is hypothesized that steady flows during the fall will benefit native fishes by stabilizing and warming the nearshore habitats that are occupied by juvenile (less than 150 mm total length) life stages of endangered humpback chub." He said the TWG recommends approving the Fall Steady Experimental Flow Plan per the motion on the agenda:

AMWG approves the plan as described in "Study Plan—Biological Resource Responses to Fall Experimental Flows Release from Glen Canyon Dam, 2009-2012," dated February 2010, with the understanding that GCMRC will prepare a synthesis of results from the various studies identified in the plan and present that to the TWG in January 2013.

Ms. Castle stated the program is currently operating under a five-year experimental plan that includes steady flows in September and October, and the motion addresses not those flows, but rather the study plan for monitoring and assessing the impact of those two-month fall steady flows. Mr. Hamill noted there was no funding in the FY12 or FY 2013 budgets to perform the synthesis TWG has requested.

During Q&A, the following points were made:

- As you add treatments such as mechanical removal to the LCR reach, you have to question whether the data relate to the steady flows or to removal efforts. (Capron)
- The science plan presents three options for consideration. Two of those options call for a delay in removal for either one year or two years to allow for studying the effects of the current trout population on HBC. The third option calls for removal to occur almost immediately. It is a risk assessment: we can protect HBC through removal, or better understand some of the uncertainties through delay of removal. (Hamill)
- In 2000, we studied two habitat maintenance flows (HMFs), one in the spring and one in the fall, with steady flows at 8,000 cfs between (low summer steady flows, or LSSF). We learned about the effects of impoundment on the LCR by the first HMF, and about the effects of the second HMF on moving non-native fish downstream. This nearshore ecology study is intended to be a contrast between fluctuations during the summer on the one hand, and steady flows in the autumn on the other, so that we can address the fundamental question of whether these fluctuating flows have negative effects. The study is structured in such a way that it will have minimal impacts on hydropower during the summer. (Kubly)
- Some testing of different flows during this experiment may give us additional opportunities for learning, but we have not completed environmental compliance for this. However, we are contemplating compliance for different flow regimes as part of the long-term experimental and management plan process. (Castle)

As there was no motion offered, Ms Castle said the recommendations expressed by the TWG, the comments offered by Mr. Capron, and the budget concerns would be considered.

Public Outreach AHG Report. (**Attachment 8** = AIF and PPT). Mr. Mike Yeatts reviewed the updated POAHG's Organizing Principles. In response to the action item from the February 2010 AMWG meeting, POAHG has determined there was still a need for a public outreach group. Mr. Yeatts provided the history of the POAHG and the current projects the group. He asked for volunteers to participate on the POAHG. Sam Jansen proposed the following motion, which was seconded by Larry Stevens:

Motion: The AMWG agrees that the Adaptive Management Program (AMP) shall continue to have a Public Outreach Ad Hoc Group, and that the group shall operate under the attached Organizing Principles dated February 7, 2011.

The motion was passed by consensus.

The following individuals volunteered to serve on the POAHG: Jan Balsom, Ann Gold, Amy Heuslein, Leslie James, Sam Jansen, Kate Kitchell, LaVerne Kyriss, John Shields, Sam Spiller, Larry Stevens, and Mike Yeatts. In addition, staff members from other stakeholder entities were encouraged to participate and provide additional public outreach support.

WY 2012 Hydrograph Development (**Attachment 9** = AIF and PPT) Mr. Capron reviewed the proposed schedule for developing the FY 2012 hydrograph:

Body	Time	Action
TWG	January	Consider initial hydrograph proposals. TWG describe proposals they have received at the February AMWG meeting.
AMWG	February	Presentation of hydrograph proposals, consideration of development process and comments. Other proposals may be offered.
TWG	March	Refinement of proposals; discussion of resource benefits, costs, and effects.
	March – June	Resource analysis conducted, final proposals developed. Potential additional analyses by GCMRC and use of GCMRC expertise in assessing resource effects from proposals.
TWG	June	Recommendation to AMWG on WY 2012 hydrograph
AMWG	August	Recommendation to Secretary on WY 2012 hydrograph.

DOI/DOE Hydrograph Proposal. Mr. Knowles said that as part of the process developing a DOI/DOE proposal for FY12, Reclamation will analyze benefits and expected benefits to resources from the FY11 DOI/DOE hydrograph proposal. Reclamation will begin that process by presenting a proposal to the TWG in March.

Grand Canyon Trust Proposed Hydrograph. Mr. Nikolai Lash said the Trust did not have a specific hydrograph proposal, but would like to submit something where the resource implications will be analyzed together. He said their hydrograph would be similar to what they presented last year, including the possibility of a high flow followed by supportive steady flows. They are aiming for flows that would best meet the mandates of the Grand Canyon Protection Act and be beneficial to resources. They hope the TWG and GCMRC will assist with a side-by-side analysis of cost and the potential benefits of alternatives.

Ms. Castle asked if there were any other hydrograph proposals, and there was none. She said bringing the DOI/DOE proposal to the TWG in March is consistent with previous practice.

During Q&A, the following points were made:

- In the past, the 24-month study has formed the basis of the hydrograph recommendation from the TWG, through the AMWG, and to the Secretary of the Interior. Last year, DOI and DOE proposed a hydrograph

that started with the 24-month study and was designed to benefit resources in Grand Canyon. This year we have the same process; again, the 24-month study forms the basis of the recommendation. (Knowles)

- Western will not know until the benefits and impacts are analyzed whether they will have a joint proposal with DOI. (Kyriss)

Public Comments:

- Mr. Gerald Myers (White Mountain Fly Fishing Club) asked when the desired size and shape of sandbars would be defined, since that would be part of the triggering criteria for the HFE. He also asked what the minimum bank of deposits below the Paria would need to be, to consider a flow. Dr. Melis told him once more is known about the desired future conditions, that information could provide the basis for developing the triggering criteria. He suggested that Mr. Myers contact Kendra Russell, a hydraulic engineer with Reclamation who is using the USGS transport model to define which hydrographs would be appropriate for which levels of sediment inputs. Her models are designed to ensure that the mass balance of sand account is not negative at year-end.
- Ms. Lynn Hamilton (Grand Canyon River Guides) commended Ms. Castle for your commitment to following through with goals she set with regard to DFCs the high flow protocol EA.

Ms. Castle thanked Jerry and Lynn for their comments, also those individuals in the federal agencies who have worked so hard in completing the environmental assessments and other assignments.

Adjourned: 5:28 P.M.

**Glen Canyon Dam Adaptive Management Work Group Meeting
February 9-10, 2011**

Conducting: Anne Castle, Secretary's Designee

Start Time: 8:15 a.m.

Facilitator: Mary Orton

Committee Members/Alternates:

Perri Benemelis, AZ Dept. of Water Resources
Charley Bullets, Southern Paiute Consortium
George Caan, Colorado River Commission/Nevada
Alan Downer, Navajo Nation
Ann Gold, U.S. Bureau of Reclamation
Martha Hahn, NPS/GRCA
Amy Heuslein, Bureau of Indian Affairs
Loretta Jackson-Kelly, Hualapai Tribe
Leslie James, CREDA
Sam Jansen, Grand Canyon River Guides
John Jordan, Federation of Fly Fishers
Ted Kowalski, Colorado Water Conservation Board

Arden Kucate, Pueblo of Zuni
Leigh Kuwanwisiwma, Hopi Tribe
LaVerne Kyriss, WAPA
Nikolai Lash, Grand Canyon Trust
Estevan López, NM Interstate Stream Commission
Ted Rampton, UAMPS
Mike Senn, Arizona Game and Fish Dept.
John Shields, Wyoming State Engineer's Office
Sam Spiller, U.S. Fish and Wildlife Service
Larry Stevens, Grand Canyon Wildlands Council
Dennis Strong, Utah Div. of Water Resources

Committee Members Absent:

Jennifer Gimbel, Colo. Water Conservation Board

Jerry Zimmerman, Colo. River Board of California

Interested Persons:

Deanna Archuleta, DOI
Jan Balsom, NPS/GRCA
Debra Bills, USFWS
Shane Capron, WAPA/TWG Chair
Lori Caramanian, DOI
Chuck Cullom, CAP
Jerry Cox, Grand Canyon River Guides
Kevin Dahl, NPCA
Mary Daugherty, USGS/GCMRC
Kurt Dongoske, Pueblo of Zuni
Helen Fairley, USGS/GCMRC
Dr. Dave Garrett, M3Research
Paul Grams, USGS/GCMRC
J. Lonnie Gourley, USBR/Glen Canyon Dam
John Halliday, DOI
John Hamill, USGS/GCMRC
Lynn Hamilton, Grand Canyon River Guides
Beverley Heffernan, U.S. Bureau of Reclamation
Norm Henderson, National Park Service
Lisa Iams, U.S. Bureau of Reclamation
Bill Jackson, NPS
Tony Joe, Navajo Nation
Lynn Johnson, DOI Solicitor's Office
Robert King, Utah Division of Water Resources

Kate Kitchell, USGS/SBSC
Glen Knowles, U.S. Bureau of Reclamation
Dennis Kubly, U.S. Bureau of Reclamation
Jane Lyder, DOI/Fish, Wildlife, and Parks
Andy Makinster, AZ Game and Fish Department
Barbara McKenzie, USGS/GCMRC
Ted Melis, USGS/GCMRC
Darrick Moe, WAPA
Gerald Myers, White Mountain Fly Fishing Club
David Nimkin, National Parks Conservation Assoc.
Mary Orton, The Mary Orton Company
Don Ostler, Upper Colorado River Commission
Clayton Palmer, WAPA
Colby Pellegrino, Southern Nevada Water Authority
Barbara Ralston, USGS/GCMRC
Pam Sponholtz, USFWS
Jason Thiriot, Colo. River Commission/Nevada
Larry Walkoviak, U.S. Bureau of Reclamation
Barry Wirth, U.S. Bureau of Reclamation
Jeffrey Woner, CREDA
Mike Yeatts, The Hopi Tribe
Willard Zunie, Pueblo of Zuni

Recorder: Linda Whetton, USBR

Charter Ad Hoc Group Report (continued). Ms. Castle said she wanted to make it clear that regardless of whether the Interior agencies are voting or non-voting members, all of the agencies would continue to have trust responsibility to the Native American tribes and pueblos. With respect to the 18-month timeframe, AMWG would decide to continue the experiment or not. She asked for comments from the tribal members.

Hopi Tribe. Mr. Kuwanwisiwma expressed concern that the agencies would lose independence in how they cast their votes. He expressed Hopi's concerns regarding the cultural issues.

Hualapai Tribe. Ms. Jackson-Kelly said she was concerned that if DOI agencies were non-voting members, there would not be transparency of their issues or discussions. Having them remain voting members would increase accountability. She said the trust responsibility issues and the legal requirements of representing DOI agencies' views and policies would affect the tribes and she felt it was important to have the DOI agencies continue to be voting members. She also felt that the BIA represents the Havasupai Tribe, which does not have the resources to attend meetings.

Navajo Nation. Mr. Downer said Navajo is supportive of the DOI agencies being non-voting members, since they have a separate line of communicating with the Secretary of the Interior.

Pueblo of Zuni. Mr. Kucate said they are supportive of having a trial period of 18 months in which the DOI agencies are not voting members on the AMWG.

Other Comments/Concerns: The AMWG discussed other issues including whether Arizona counties and businesses should be included as members.

After discussion, the motion was revised as follows, and a roll call vote was held:

Motion (Proposed by George Caan, seconded by Dennis Strong): AMWG recommends that the Secretary of the Interior adopt the changes to the AMWG Charter; and if the Secretary does so, that the AMWG adopt the operating procedures as attached in the draft from the Charter Ad Hoc Group dated February 9, 2011 and request that the CAHG review the level of participation of the DOI agencies approximately 18 months after the institution of the new Charter and make a recommendation to the AMWG as to whether the ex-officio nature of their involvement should continue.

Stakeholder	Vote	Stakeholder	Vote
Arizona	Y	Hualapai Tribe	Y
Arizona Game and Fish Department	Y	National Park Service	A
Bureau of Indian Affairs	A	Navajo Nation	Y
Bureau of Reclamation	A	Nevada	Y
California	absent	New Mexico	Y
Colorado	Y	Pueblo of Zuni	Y
Colorado River Energy Distributors Association	Y	Southern Paiute Consortium	absent
Federation of Fly Fishers	Y	Utah	Y
Fish and Wildlife Service	A	Utah Associated Municipal Power Systems	Y
Grand Canyon River Guides	Y	Western Area Power Administration	Y
Grand Canyon Trust	Y	Wyoming	Y
Grand Canyon River Wildlands Council	A	San Juan Southern Paiute	vacant
Hopi Tribe	N		

Voting Results: Yes = 16	No = 1	Abstaining = 5	Total Voting = 17
Motion Passes			

Motion (Proposed by Mike Senn, seconded by Alan Downer): AMWG asks the CAHG to re-evaluate the recommendation regarding the composition of the AMWG, based on input provided at the February 2011 AMWG meeting, for possible consideration at the next regularly scheduled AMWG meeting.

Discussion included the following points:

- CAHG already discussed the composition of the AMWG at some length, and decided not to recommend a change.
- It would be incumbent upon the AMWG to help the CAHG contact the right groups or people if this motion passed.
- Ms. Benemelis would be happy to increase the outreach effort through ADWR's watershed groups by providing them with information about the program.
- There are other potentially interested groups such as water users, power users, any counties along the rivers, and the tributaries to the Colorado River.

A roll-call vote was taken, as follows:

Stakeholder	Vote	Stakeholder	Vote
Arizona	N	Hualapai Tribe	Y
Arizona Game and Fish Department	Y	National Park Service	A
Bureau of Indian Affairs	A	Navajo Nation	Y
Bureau of Reclamation	A	Nevada	N
California	absent	New Mexico	N
Colorado	N	Pueblo of Zuni	N
Colorado River Energy Distributors Association	N	Southern Paiute Consortium	absent
Federation of Fly Fishers	Y	Utah	N
Fish and Wildlife Service	A	Utah Associated Municipal Power Systems	N
Grand Canyon River Guides	N	Western Area Power Administration	N
Grand Canyon Trust	N	Wyoming	N
Grand Canyon River Wildlands Council	Y	San Juan Southern Paiute	vacant
Hopi Tribe	Y		
Voting Results: Yes = 6 No = 12 Abstaining = 4 Total Voting = 18			
Motion Fails			

Ms. Castle told those who voted in favor of this motion that she greatly appreciated their input. She said there are a number of reasons to ensure that the AMWG receives appropriate input from all interested members of the public.

GCMRC Updates (continued)

Low Summer Steady Flow Synthesis. Dr. Barbara Ralston provided a PPT, “Low Summer Steady Flows Report Status and Preliminary Conclusions” (**Attachment 10**). She anticipates the report will be available to the public in April. She said Reclamation identified a need for a plan of experimental flows for native fishes with the following objectives: enhance survival and growth of young native fishes by providing stable, warm, productive shoreline nursery habitats; increase recruitment of native fishes; minimize adverse effects of non-native fishes; and contribute to recovery of endangered humpback chub.

Comments included:

- The science costs associated with the effort were approximately \$3.5 million.
- It took 11 years to report on the work because there was no budget for preparing the report. In addition, shortly after completing the LSSF work, they started work on figuring out what to do with non-native fish in the mainstem.
- AMWG needs to test something like an LSSF, or different versions of LSSF, or support something like a 4-year experimental block. A complete SASF was not run because GCMRC had less than a month to gear up and the lack of monitoring weakened the interpretive ability.

Technical Work Group Chair Report (continued)

Core Monitoring Plan. (**Attachment 7b**). Mr. Capron said the goal of the CMP is to 1) Develop a robust, long-term monitoring program that is core to the goals of the AMP; 2) Support critical functions of the AMP and provide the foundation to answering critical questions or supporting critical management actions, and 3) Projects would not be altered in periods of funding challenges. He explained the revisions made to the plan and the need to develop Appendix B in order to evaluate the trade-offs. The next steps are to made final changes to the document, revise Appendix B, integrate SA comments, obtain TWG approval in March, and implement decision support activities.

Ms. Kate Kitchell said GCMRC views the CMP as a good process for priority setting and integrating science planning in the bigger context as it relates to all of the science planning. Dr. Dave Garrett said the CMP is a critical plan and he believes it should reside in the LTEMP EIS process.

Annual Reporting Meeting Schedule. Mr. Capron said at the AR meeting held on January 18-19, 2011, GCMRC provided written reports from all its projects. This forms the foundation for budget and

workplan changes and policy considerations, and serves as a good source for the administrative record for the GCDAMP. They developed a list of 24 items that need TWG and the BAHG attention.

Schedule for the Year. Mr. Capron provided the following schedule for upcoming meetings:

- Feb-Mar 2011 BAHG review of workplan issues
- March 7 Economics 101 Training
- March 8-9 2-day TWG Meeting, budget changes, hydrograph
- June 2-day TWG meeting, final FY12 budget changes, hydrograph
- Sept/Oct: 2-day TWG Meeting

Socioeconomics AHG Update. Mr. Capron reported the TWG created the Socioeconomics Ad Hoc Group based on a motion from the AMWG in August 2010. Their work (workshop and conference calls) has focused on the information needs (INs) associated with each study or analysis and how the information would be useful to the program; prioritization of INs; scope and costs associated with each project; potential fund sources; and a thorough review of the economics panel report. They will prepare a recommendation at the June TWG meeting to be forwarded to the August AMWG meeting.

Ms. Castle asked if there were items that could feed into the LTEMP process. Mr. Capron said DOI needs to let TWG know what information they need for the LTEMP. Ms. Castle is also looking to the SEAHG to identify the policy issues for consideration by the AMWG.

Fall Steady Experimental Flows (cont.). As follow-up to yesterday's discussion, Mr. Dennis Strong offered the following motion, which was seconded by LaVerne Kyriss:

[The AMWG directs the GCMRC to prepare a synthesis of results from the various studies identified in the "Study Plan—Biological Resource Responses to Fall Steady Experimental Flows Released from Glen Canyon Dam, 2009-2012," and present it to the TWG in January 2013.](#)

Discussion items included concerns regarding the cost of doing the synthesis, whether the synthesis effort would impact GCMRC's ability to provide science support in the LTEMP EIS process (Mr. Hamill said it would depend on the scope of the work), and whether time should be spent synthesizing negative results. After discussion, the motion was revised as follows:

Motion: AMWG approves the plan as described in "Study Plan—Biological Resource Responses to Fall Steady Experimental Flows Released from Glen Canyon Dam, 2009-2012," dated February 2010, with the understanding that GCMRC will prepare a synthesis of results from the various studies identified in the plan and present that to the TWG in January 2013.

The motion was passed by consensus.

Post-ROD Economic Analysis. (**Attachment 11** = AIF, Fact Sheet, and PPT). Ms. LaVerne Kyriss gave a PPT, "Ex-Post Economic Analysis of the Electrical Power System Impacts of Environmental Restrictions at Glen Canyon Dam Following the 1996 Record of Decision." She said the 2005 SCORE report indicated there had been no ex-post economic analysis. Western tasked Argonne National Laboratory to determine the economic impact of the operational changes made to Glen Canyon Dam after implementing the ROD for the 1995 GCD EIS (www.wapa.gov/crsp/newsrsp/default.htm). The study provided the following results:

- Annual average economic impact of the GCD ROD on the electrical power system:
 - \$50 million (in today's dollars)
 - \$40 million (in today's dollars) if the increased costs from the California energy crisis were removed.
- Compared to the range of possible impacts described in the GCD EIS:
 - \$22.4 million * (Hydro method)
 - \$65.5 million * (CROD method)

* Adjusted to today's dollars for direct comparison

Ms. Kyriss said the costs incurred as a result of their changes in operation were shifted to power customers. Ms. James pointed out that this particular study was based on actual costs, not assumptions on pricing.

Desired Future Conditions Update. (**Attachment 12** = AIF). Mr. Larry Walkoviak reported that at the request of Ms. Castle, a group of individuals from DOI and DOE reviewed and edited the DFCs documents from the federal perspective. Ms. Castle said the document would now be reviewed by the DOI regional directors, and a revised copy will be provided to the Secretary of the Interior with a recommendation for adoption. A redline/strikeout copy will also be provided to the AMWG.

Mr. Caan the important thing would be to look at more quantitative issues in order to inform the LTEMP EIS process.

Long-Term Experimental and Management Plan EIS. (**Attachment 13** = AIF and PPT) Ms. Castle reminded the members that Secretary Ken Salazar announced in December 2009 that he would be directing the GCDAMP to begin the process of a new long-term experimental and management plan. The program is now operating under a plan designed in 1995; the environmental compliance is 15 years old and it is time to incorporate what has been learned since then into a new long-term plan. The scoping process has begun. While the last EIS cost around \$100 million, the program cannot afford that amount now, so the process will be streamlined.

Mr. Knowles gave a PPT that reviewed the purpose and need statement as well as goals for 2011. He said a kick-off meeting with potential cooperating agencies would be held on February 11, 2011, and federal register notice initiating scoping would likely be released this spring.

Comments included concern that the focus was on non-native fish control and not recovery goals for the HBC; and a suggestion that it be called a long-term adaptive management plan rather than an experiment and management plan.

Tribal Liaison Report. (**Attachment 14** = AIF and PPT) Mr. Halliday explained that his role as the new Tribal Liaison includes working with the Secretary's Designee to establish government-to-government relations with the tribal leaders of the eleven tribes that have interests that may be affected by operations of Glen Canyon Dam, representing the Secretary's Designee in meetings with tribal representatives, analyzing proposed plans and projects potentially affecting Native American interests, and collaborating with regional DOI personnel to ensure that the needs and expectations of Native American tribes are understood and accommodated to the extent possible.

He said he was addressing the non-native fish removal issue, and that some tribes consider the removal area as a sacred place. They were searching for a way to be in compliance with the ESA and the recovery plan, while not being offensive to the tribes. Two Structured Decision Making (SDM) workshops were held to allow the participating agencies and tribes to express their individual judgments about how trade-offs should best be managed in Reclamation's selection of a preferred alternative. The following tribes participated: the Hopi Tribe, Pueblo of Zuni, Hualapai, and the Southern Paiute Consortium. He reported on the tribes with which he had visited and whether they intended to participate in an LTEMP EIS process.

Non-Native Fish Control Management EA. (**Attachment 15** = AIF and PPT). Mr. Knowles said Reclamation has been developing an environmental assessment for non-native fish control. Since early 2000, the tribes had expressed concerns about non-native fish removal because the taking of life is something of great concern, especially in such a sacred place as the Grand Canyon. In response to concerns expressed by the Pueblo of Zuni, DOI cancelled mechanical removal trips in

2010 and Reclamation reinitiated consultation with the FWS on the possibility of not implementing the non-native fish removal conservation measure. They also began development of an environmental assessment. The purpose of the action is to reduce the negative impacts of competition and predation by rainbow and brown trout on the endangered humpback chub. The need is to fulfill the conservation measures and terms and conditions of several USFWS biological opinions; to contribute to the recovery of HBC by helping to maintain high juvenile survival and recruitment rates resulting in an increasing adult population; and to address concerns expressed by American Indian Tribes over the killing of trout in the Grand Canyon, a location of cultural, religious, and historical importance to the tribes.

Mr. Knowles said Dr. Mike Runge with the USGS Patuxent Wildlife Research Center assisted with the Structured Decision Making (SDM) workshops mentioned by Mr. Halliday. They used SDM to define objectives for undertaking non-native fish control, and then they assessed alternatives against the array of objectives using a multi-criteria analysis method. The cooperating agencies were involved in every step of the process. Reclamation selected the proposed action using this method. Mr. Knowles said any removed fish would be frozen for later beneficial use, and the proposed action would take place from 2011-2020. He encouraged everyone to read the SDM project report (<http://www.usbr.gov/uc/envdocs/ea/gc/nafc/index.html>) to see how they arrived at the decision. Reclamation and other DOI agencies are considering modifications to the proposed action as a result of comments already received.

Arden Kucate said he was instructed to go on record today to say that, after year and a half of dialogue between DOI and Zuni, it is still Zuni's opinion that they are not being provided with meaningful input and consideration of the Zuni cultural concerns related to the mechanical removal and the killing of the trout in the Canyon. Mechanical removal would have a detrimental impact on the livelihood of more than 10,000 members of the Zuni village and the community. The Governor is considering elevating this particular concern to the level of the Secretary.

Informational Reports. (**Attachment 16** = AIF) There were no questions regarding these reports.

Mediator/Facilitator Role. (**Attachment 17** = AIF) Ms. Orton said in the few minutes left, she would touch on only one part of her presentation. She emphasized that self-determination is a key principle in mediation: AMWG members should expect to have say in which mediator is retained, evaluating her performance, and establishing her role. In the U.S. Institute for Environmental Conflict Resolution survey and interview, there was a question about her facilitation, and the report contained three comments referring to her as biased. There were no details given, so they were left wondering if she was seen as biased toward one interest over another at the table, towards science and against management, or something else. She said the AMWG should evaluate her or any other mediator on an annual basis, and that the bias issue is very important: the group deserves to have someone they trust serving as the mediator.

ACTION ITEM: Ms. Castle asked that AMWG members send comments regarding Mary Orton's performance as the AMWG mediator/facilitator to Linda Whetton by February 18, 2011. Those comments will be forwarded to Ms. Castle with or without attribution, as noted by the sender, and should contain enough details so Ms. Castle can address any concerns.

Other AMWG Issues:

TWG Appointments. Ms. Castle said until the Charter is revised, the old process would be followed. As such, TWG members and alternates can be appointed fairly quickly.

HBC Ad Hoc Group. Ms. Castle said she wanted to revisit the issue after the group had heard the discussion on the long-term experimental and management plan process and the non-native fish

control environmental assessment. Her concern is that re-constituting the HBC AHG could be parallel to these other efforts and another resource drain among the people involved in the program. She was hoping the issues that would be addressed by the HBC AHG could be subsumed into the LTEMP process or possibly in the non-native EA process. She asked if there was further discussion.

AMWG Meetings. Ms. Castle said she would like to hold two additional face-to-face meetings this year: a one-day meeting in May to address budget issues, and a two-day meeting in August with the goal of forwarding a budget recommendation and hydrograph to the Secretary. She said an e-mail would be sent to the members requesting their availability.

Concluding Remarks: Ms. Castle thanked the members for their attention and devotion to the process during the last two days. She thanked all those who have been working on the two environmental assessments and the time involved in getting those drafts completed on time.

She acknowledged it was George Caan's last AMWG meeting and thanked him for his efforts to help the group understand multiple issues surrounding the many complex issues the AMWG addresses. She acknowledged his contributions and told him that he elevated the level of discussions at the meetings and would be missed. On behalf of the AMWG, she wished him well in his new job and said she looks forward to working with him on Department of the Interior water issues.

Farewell Remarks From George Caan: George said that the AMWG does great work and the work is important. He said he was hopeful that the direction that this program has taken over the last year under Anne Castle's leadership would prove to be sustainable. He thanked the members for their efforts and friendship.

Public Comments: None

Adjourned: 2:50 p.m.

Attachment 18: E-mail Dated April 5, 2011, Subject: Message from Anne Castle on GCMRC Science Planning Process and two attachments: 1) 2011-03-31 GCMRC Priorities MKS, and 2) Streamlined GCMRC – AMP Workplan Process Summary ver. 4-3-11.

Respectfully submitted,

Linda Whetton
Bureau of Reclamation
Upper Colorado Region

Key to Adaptive Management Program Acronyms

DWR – Arizona Dept. of Water Resources
AGFD – Arizona Game and Fish Department
AMP – Adaptive Management Program
AOP – Annual Operating Plan
BAHG – Budget Ad Hoc Group
BE – Biological Evaluation
BHMF – Beach/Habitat Maintenance Flow
BIA – Bureau of Indian Affairs
BOR – Bureau of Reclamation
CAPA – Central Arizona Project Association
CESU – Cooperative Ecosystems Studies Unit
CMINs Core Monitoring Information Needs
CRAHG - Cultural Resources Ad Hoc Group
CRE Colorado River Ecosystem
CRSP – Colorado River Storage Project
DASA - Data Acquisition, Storage and Analysis
DBMS – Data Base Management System
DOI – Department of the Interior
EIS – Environmental Impact Statement
FACA – Federal Advisory Committee Act
FRN – Federal Register Notice
FY – Fiscal Year (October 1 – September 30)
GCT Grand Canyon Trust
GCNP – Grand Canyon National Park
GCPA – Grand Canyon Protection Act
GRCA Grand Canyon National Park
GCWC Grand Canyon Wildlands Council
HMF – Habitat Maintenance Flow
INs – Information Needs
KAS – Kanab ambersnail (endangered native snail)
LRRMCP – Lower Colorado River Multi-Species Conservation Program
MAF – Million Acre Feet
MATA – Multi-Attribute Trade-Off Analysis
MO – Management Objective
NAU – Northern Arizona University (Flagstaff, AZ)
NHPA – National Historic Preservation Act
NRC National Research Council
PA – Programmatic Agreement
POAHG – Public Outreach Ad Hoc Group
R&D – Research and Development
RFP – Request For Proposals
ROD Flows – Record of Decision Flows
SA – Science Advisors
SCORE – **S**tate of the **C**olorado **R**iver **E**cosystem
SOW – Scope of Work
SPG– Science Planning Group
SWCA – Steven W. Carothers Associates
TCP – Traditional Cultural Property
TWG – Technical Work Group
UDWR – Utah Division of Water Resources
USFWS – United States Fish & Wildlife Service
WAPA – Western Area Power Administration
Q/A/C/R = **Q**uestion/**A**nswer/**C**omment/**R**esponse

AF – Acre Feet
AIF Agenda Information Form
AMWG – Adaptive Management Work Group
BA – Biological Assessment
BCOM – Biological Conservation Measure
BHBF – Beach/Habitat-Building Flow
BHTF – Beach/Habitat Test Flow
BO – Biological Opinion
CAHG – Charter Ad Hoc Group
GCT Grand Canyon Trust
cfs – cubic feet per second
CRBC – Colorado River Board of California
CRCN – Colorado River Commission of Nevada
CREDA – Colorado River Energy Distributors Assn.
DAHG – Desired Future Conditions Ad Hoc Group
CWCB – Colorado Water Conservation Board
DOE Department of Energy
EA – Environmental Assessment
ESA – Endangered Species Act
FEIS – Final Environmental Impact Statement
FWS – United States Fish & Wildlife Service
GCD – Glen Canyon Dam
GCMRC – Grand Canyon Monitoring & Research Ctr.
GCNRA – Glen Canyon National Recreation Area
GLCA – Glen Canyon National Recreation Area
GCRG Grand Canyon River Guides
HBC – Humpback Chub (endangered native fish)
HPP – Historic Preservation Plan
KA Knowledge Assessment (workshop)
LCR – Little Colorado River
LTEP – Long Term Experimental Plan

MA – Management Action
MLFF – Modified Low Fluctuating Flow
MRP – Monitoring and Research Plan
NEPA – National Environmental Policy Act
NPS – National Park Service
O&M – Operations & Maintenance (USBR funding)
PEP – Protocol Evaluation Panel
Powerplant Capacity = 31,000 cfs
RBT – Rainbow Trout
RINs – Research Information Needs
RPA – Reasonable and Prudent Alternative
Secretary – Secretary of the Interior
SHPO – State Historic Preservation Office(r)
SPAHG – Strategic Plan Ad Hoc Group
SSQs – Strategic Science Questions
TCD – Temperature Control Device
TES – Threatened and Endangered Species
UCRC – Upper Colorado River Commission
USBR – United States Bureau of Reclamation
USGS – United States Geological Survey
WY – Water Year (a calendar year)