

## Glen Canyon Dam Technical Work Group Meeting

October 24-25, 2012

**October 24, 2012**

**Conducting:** Shane Capron, Chairperson  
Facilitator: Chris Page with Triangle Associates, Inc.

**Convened:** 9:40 a.m.

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

Jan Balsom, NPS/GRCA  
Cliff Barrett, UAMPS  
Kerry Christensen, Hualapai Tribe  
Jerry Lee Cox, Grand Canyon River Guides  
Kevin Dahl, Grand Canyon Trust  
Bill Davis, CREDA  
Craig Ellsworth, WAPA  
Amy Heuslein, BIA  
Chris Hughes, NPS/GLCA  
Vineetha Kartha, State of Arizona

Glen Knowles, Bureau of Reclamation  
Marianne Crawford, Bureau of Reclamation  
Gerald Myers, Federation of Fly Fishers  
D. Randolph Seaholm, State of Colorado  
LeAnn Skrzyński, Southern Paiute Consortium  
Larry Stevens, GCWC  
Bill Stewart, AGFD  
Jason Thiriot, State of Nevada  
Michael Yeatts, Hopi Tribe

### **Committee Members Absent:**

Charley Bullets, Southern Paiute Consortium  
Kurt Dongoske, Pueblo of Zuni  
Paul Harms, State of New Mexico  
Chris Harris, State of California  
Tony H. Joe, Jr., Navajo Nation  
Robert King, State of Utah

Ted Kowalski, State of Colorado  
Nikolai Lash, Grand Canyon Trust  
Don Ostler, Upper Colorado River Commission  
McClain Peterson, State of Nevada  
John Shields, State of Wyoming  
Randy Van Haverbeke, USFWS

### **Grand Canyon Monitoring and Research Center:**

Helen Fairley, USGS/GCMRC  
Jack Schmidt, USGS/GCMRC  
Scott Vanderkooi, USGS/GCMRC

### **Interested Persons:**

Mike Anderson, NPS/GLCA  
Mary Barger, USBR  
Peter Bungart, Hualapai Tribe  
Todd Chaudhry, NPS  
Dave Garrett, M<sup>3</sup>Research/Science Advisors  
Loretta Jackson-Kelly  
Leslie James, CREDA  
John Jordan, Federation of Fly Fishers

Mark McKinstry, Bureau of Reclamation  
Chris Page, Triangle Associates, Inc.  
Sarah Rinkevich, FWS  
Seth Shanahan, SNWA  
Rich Valdez, SWCA  
Mark Van Vlade, State of California  
Kirk Young, FWS

**Meeting Recorder:** Linda Whetton

**Welcome and Administrative.** Welcome from Shane Capron, outgoing TWG chair. Shane will become the TWG representative for WAPA and Craig Ellsworth, the alternate.

1. Approval of April 16-17, 2012, Meeting Minutes – Without objection, the minutes were approved.
2. Approval of June 20-21, 2012, Meeting Minutes – Approval will be handled at the next TWG meeting.
3. Review of Action Items (Attachment 1). There is some confusion on the status of the DOI Consultation Plan. An update will be provided at the next TWG meeting.
4. Old Business  
Ad Hoc Group Updates (**Attachment 2**): Shane
  - o CRAHG - Any objection from TWG to having the CRAHG assist with integrating tribal presentations in the Annual Reporting meeting. Mary suggested this be handled by the Tribal

Liaison as it may not be appropriate as a CRAHG assignment. More discussion is needed with DOI staff.

**ACTION ITEM:** Follow up with DOI personnel on role of tribes in planning and/or participating in the annual reporting meetings.

- Core Monitoring AHG – A revised charge will be developed during tomorrow's discussion.
- SEAHG – Dr. Dave Garrett will continue to serve as the chair. It was Reclamation's intent to have Dave Harpman serve as the co-chair, but Dave is now committed to working on the LTEMP EIS.
- Operating Procedures AHG – Shane has been stepping in for Chris Harris for this group as well as for other ad hoc groups. In light of his term ending as TWG Chair, he will need to reassess his involvement in this and other TWG assignments.
- Administrative History - An update will be provided at tomorrow's meeting.
- Two EAs, LTEMP EIS Updates. Glen Knowles
  - With completion of the EAs in May and subsequent FONSI's a secretarial directive implementing the two FONSI's was released. It established a leadership team of the five DOI agencies to implement the two actions of non-native fish control and the high flow experiment protocol. In July a memo from the Deputy Asst. Secretary provided more detail on how the implementation of the secretarial directive would work.
    - Non-native fish control and whirling disease - Reclamation modified the proposed action by cancelling two trips to remove rainbow trout from the Paria to Badger Creek Reach. This project was intended to be to provide researchers with information concerning trout control in that reach of the river and the effect of removal on downstream trout movement. Due to tribal concerns the project planned to remove the fish alive and stock them elsewhere. The trout were found to have whirling disease which prevents them from being relocated. In a letter to FWS on October 3, 2012, Reclamation described the situation and determined reinitiation of consultation was not necessary. The Service concurred. This project may be valuable to revisit to determine the effect on non-native fish movement downstream and the effect on native fish. The signatories to the NHPA MOA are working to resolve on the complications of whirling disease while meeting the spirit of the agreement and staying in compliance with NHPA.
    - The secretarial directive established an HFE leadership team and a technical team. The HFE Technical Team has weekly coordination calls and is developing a hydrograph. The leadership team will meet Monday (Oct. 29) to make a final decision on implementation of the fall HFE. If it occurs, the media event will be on Nov. 19.
  - LTEMP EIS. Reclamation and NPS are working toward development of alternatives and have been reaching out to others that submitted information prior to the July 2<sup>nd</sup> deadline, including the basin states and CREDA. Final draft alternatives should be available for the February 2013 AMWG meeting. LTEMP EIS updates will become a standing agenda item under old business for future TWG meetings.

**ACTION ITEM:** Reclamation will keep the TWG informed of plans for a potential HFE in mid-November.

## 5. New Business

- Update on Recovery Plans – FWS is reconvening some of the recovery teams. First will be the Colorado River pikeminnow followed by the humpback chub.
- Annual Reports Meeting will be held January 22-23, 2013 at ADWR.
- **ACTION ITEM:** The TWG Chair will follow up on discussions and/or presentations for the AR Meeting.

- TWG Meeting → January 24, 2013 at ADWR. A doodle poll will be sent out requesting availability for a 2-day early April meeting. Members were encouraged to utilize the “comments box” for any potential meeting conflicts.

**Update on TWG Facilitation.** Mary Orton’s 5-year facilitation contract expired and Reclamation was required to advertise a new contract. It was awarded to Triangle Associates, Inc., out of Seattle Chris Page from Triangle was introduced and will facilitate some TWG meetings. Bob Wheeler, will facilitate AMWG meetings.

**Assessment of 1-Year Trial Period.** In June 2011, the TWG decided to employ the facilitation services of The Mary Orton Company, LLC for the following year. An evaluation was conducted through an online questionnaire in August and September 2012. Shane distributed copies of the survey results (**Attachment 3**) and the following comments were captured:

- *Question of Mary’s neutrality on some issues.*
- *Need to do better job of bringing divergent ideas out and getting comments from more members.*
- *There’s a perception that “she” is on “their” side. The group needs to be prepared to be facilitated.*
- *Like the idea of polling, but people need to be prepared and allow more time on the agenda.*
- *Mary’s history with the program and being able to explain things and clarify questions was very helpful.*
- *Liked breaking into small groups and using cards to arrive at consensus on issues.*
- *Mary could bring us back to the basics of the program and explain how things fit with the operating procedures. She allowed us to remember and reduce the duplicative comments.*
- *Having the continuity of working between TWG and AMWG meetings was a real bonus, but think Triangle can bring some new eyes to the process.*
- *The best thing for a facilitator is to keep a log and not revisit things.*
- *She helped the group work toward arriving at consensus. Would encourage Triangle to do that.*

Glen noted that if a non-federal employee gets elected as the next TWG chair, the funds budgeted for the position may not be available for having facilitation at every TWG meeting. There needs to be more discussion on how to strategically use facilitation at critical TWG decision-making meetings, particularly at budget ad hoc group meetings.

**Election of New TWG Chair.** Glen Knowles said the TWG Operating Procedures identify a chair and a vice-chair but the operating procedures are being revised. Shane has done a great job over the past four years. The position is much different due to Shane’s willingness to take on more responsibilities.

Request for TWG Chair nominations.

Larry Stevens nominated John Jordan, Kerry seconded.

John was unanimously appointed as the new TWG Chair.

John Jordan looks forward to the new assignment. Shane proposed creating a steering committee to work with John on developing meeting agendas and facilitate a smooth transition. The following individuals volunteered to serve on the Steering Committee Ad Hoc Group: Shane Capron, Marianne Crawford, Craig Ellsworth, John Jordan, Vineetha Kartha, Larry Stevens, and Jason Thirirot.

**ACTION ITEM:** TWG members who would like to serve on the Steering Committee Ad Hoc Group to help with the transition between TWG chair assignments should let John Jordan as soon as possible.

**Whirling Disease Update (Attachment 4a)** Bill Stewart said that although whirling disease has been detected before at Lee’s Ferry, the incidence is currently higher. Extensive laws and regulations are in place to prevent or control the spread of invasive species. The State of Arizona passed the “Aquatic Invasive Species (AIS) Interdiction Act” in 2009 which reads “Except as authorized by the Arizona Game and Fish Department Commission, a person shall not: Possess, import, ship or transport into or within this state, or cause to be imported, shipped or transported into or within this state, an aquatic invasive species.” He reviewed the life cycle of whirling disease and provided the following information on the effects of invasive species on fish populations:

- Trout species are highly susceptible to whirling disease, primarily rainbow and cutthroat.

- It's not harmful to humans and the trout in infected waters are okay to eat.
- It's been detected in 25 of the 50 states and in some has had little to no impact on the trout population, while in others it has devastating impacts.
- The Madison River in Montana and the Gunnison River in Colorado lost over 90% of the trout population.

The AzGF Department has been sending annual samples since 1999 to check for the presence of whirling disease. In 2011 they sent in 18 batches of fish and four of those tested positive. One of the positive batches came from the upper third of the river.

Dr. Vanderkooi provided a memo to Glen Knowles dated Oct. 22, 2012, (**Attachment 4b**), on the implications of the presence of whirling disease in Glen Canyon implications for proposed management actions in the Colorado River. Live removal and relocation of trout from the Colorado River represents by far the greatest risk of spreading the disease. Relocation of trout from an infected population without any risk of fish escapement or spread of myxospores is virtually impossible. There is a low risk of spreading whirling disease as a consequence of conducting experimental floods. The disease is already present downstream from Glen Canyon Dam and infected fish are already moving into Marble and Grand Canyons. It is likely that HFEs will result in a decrease in the prevalence and severity of the disease because it reduces the abundance of the intermediate host *T. tubifex* and its preferred habitat of fine sediment and organic matter.

#### Concerns:

- *Endangered Apache and Gila trout are very susceptible to whirling disease which accentuates the importance of containing it.*
- *The San Juan River is heavily infected, to tell the public to take protective measures to keep the disease out of other waters; have boats, gear, and other potential vectors sanitized. A method for diseased fish disposed needs to be developed primarily in the case the trigger for trout removal at the LCR is met. If live removal can't be done, reconsultation will be necessary. This is a subject that needs immediate discussion. There is a need for a deliberate process to determine the frequency of occurrences in the Lee's Ferry population.*

**ACTION ITEM:** Update at the next TWG meeting on progress of non-native fish removal; the method deemed appropriate for removal; the consultation that may be required; a synthesis of HFE results.

Status of Federation of Fly Fishers Representation on TWG. Jerry Myers will be the new TWG member replacing John Jordan who has been elected to TWG Chair.

**Science Plan and Sediment Update.** Dr. Jack Schmidt said USGS doesn't make policy recommendations. The decision to conduct a high flow experiment was based on the recommendations Reclamation forwarded to the HFE Technical Team as described in the "General Science Plan for Monitoring and Research of a High-Flow Experiment Protocol at Glen Canyon Dam" dated December 22, 2011 (**Attachment 5a**). He gave a PPT presentation on "The Physical System" (**Attachment 5b**), noting the following:

- Fine sediment enters the river from tributaries (primarily the Paria River), the sand and mud is initially deposited on the channel bottom and at low elevation. This sand and mud is quickly transported downstream. The mud is transported most quickly and the sand that remains on the bed becomes coarser. A comprehensive fine sediment measurement program is in place to track inputs and exports. It's very rare to have a September that's drier than August. It is a challenge to measure the Paria River and understand how to take advantage of the Paria River sediment contributions. The flow duration curve graph, describes the percent of time the river is at specific discharges.
- 15% of the time the flow of the Paria River is less than about 20 cfs.
- 1% of the time the flow is at or above 180 cfs.
- 0.1% of the time the flows are at 1,000 cfs. To understand this, one has to think in terms of .1% of a year which is 3.65 or about 4 days.

The program has not readily adopted the rapid response proposals of triggering based on input from the Paria River. It's an enormous challenge to plan around fluctuations. Between July 1 to October 1, an estimated 533,000–680,000 metric tons came in from the Paria River. The largest amounts came in early August and late August. A lot of sediment entered the system during high transport from dam releases, that moved it through the system. When there was an opportunity to turn the “conveyor belt” off and retain the sediment in the system, essentially nothing came in. After September 1, flows stopped moving sediment through due to Fall Steady Flows. Reclamation will have to grapple with this in future years because the low flows were and ecological experiment.

Sand was exported out of upper Marble Canyon through September 1 when it slowed down greatly. The last floods came in during late August. There was only a one week time period when enough sand and a high capacity of water to get rid of it overlapped and that was when the river was turned off for fall steady flows. The amount of sediment that accumulated in upper Marble Canyon is between 470,000 and 690,000 tons. Little to no fine sediment accumulated in lower Marble Canyon. The mass balance prior to the 2004 HFE was less than what is thought to be available now. There were more favorable conditions before the 2004 flood and less before the 2008 flood.

GCMRC scientists (Dave Topping, Paul Grams, Dave Rubin, Scott Wright, Ted Melis) discussed what would be the most advantageous flood design. They started with a general model that Nick Williams (Reclamation) had designed using an upramp rate which is the same as it was in 2004 and 2008; 21 hours from powerplant capacity to peak, a very slow rate. There would be some advantage in repeating that experimental design. The group advocated a 10-hour period rise and peak flow held for 24 hours. The period of rise and the peak is very important in understanding what the concentration of sediment. There are measurements that compare the HFEs of 1996, 2004, and 2008. Learning drops off substantially after 24 hours and rather than go with the peak that was projected in the EA, the best professional judgment of the GCRMC sediment transport and geomorphology staff is to propose a slow rate of recession from peak to maximum powerplant capacity, not necessarily for advancing the science but because it will build more usable and better sandbars for the recreational community for the general ecosystem.

**High Flow Experiment Update.** Glen Knowles gave a PPT presentation (**Attachment 5c**). In order to conserve sediment, dam operations will be 5,000-8,000 cfs before and after the hydrograph. The Leadership Team will meet on Monday to review the HFE Technical Team's recommendation and a decision will be made that day. Ramping up would begin on Sunday, November 18 at 1500 cfs per hour. The jet tubes would be open at noon on Monday, November 19. There will be a ceremony with dignitaries, i.e., the Secretary of Interior and personnel from Reclamation, USGS, NPS and tribes. The tubes will be opened around noon and full capacity will be 42,300 cfs for 24 hours. The “slow down” ramp in comparison to previous HFEs should maximize sediment conservation benefits downstream. The downramp rate will start at 200 cfs per hour and decrease to 31,300 cfs, then drop to 1,000 cfs per hour until it reaches powerplant capacity (28,000 cfs). It will then be decreased 1,500 cfs per hour. The event will be completely concluded around 8 p.m. on November 23, 2013, at 5,000 cfs. After the flood, between Nov. 23 and Dec. 1, the flows will continue to be 5,000 to 8,000 cfs. On December 1, the flows go back to fluctuating flows (MLFF).

- There are no campsite monitoring trips scheduled after the flood recedes but preliminary data will be presented at the AR meeting in January. A number of cameras will capture images from sandbar monitoring sites. Crews will pull the digital chips from the cameras and Paul Grams will lead the effort in downloading and interpreting the data.
- Ted Kennedy and his crew will be sampling before, during, and after the flood but only invertebrate drift during the flood. A couple of weeks after the flood there will be another trip to continue the 6 week monitoring routine.
- Fish monitoring includes a number of trips that have been taken this fall and one on the water right now, the Natal Origins Marking Project. One trip has been added for the HFE and is a follow-up fish sampling trip in Glen Canyon during the first week of December, to recapture tagged fish

and to conduct a mark-recapture study to look at changes in population area. The next trip in January will monitor trout through Glen Canyon, Marble Canyon, and juvenile chub near the LCR confluence.

Concerns:

- *Are volumes coming out of releases that would otherwise be released in February or March?*
  - *They will be taken from February.*
- *Potential cost range of \$580K- 1.9M depending on the duration and patterning.*
  - *The HFE Technical Team is preparing a memo to the Leadership Team with the information and it will become part of the administrative record.*
- *It would be beneficial to have a presentation from WAPA on their analysis.*
  - *The HFE Technical Team is preparing a memo that will include the costs and analysis done.*
- *What is GCRMC's comfort level for determining HFE impact on the foodbase and native and non-native fish at three to nine months out from the HFE.*
  - *Most of the effort is targeted in the upper reach. GCMRC feels they have a robust sampling effort under regular work and will be adding an additional trip.*

**Status on Ongoing Research of Razorback Suckers in Lake Powell, Western Grand Canyon, and Lake Mead.**

Dr. Mark McKinstry said over the last 15-18 years, Reclamation has had several biological opinions that directed work through the MSCP program on razorback sucker in Grand Canyon, Lake Mead, and the lower Colorado. Reclamation has initiated an investigation of potential habitat for razorback sucker in the lower Grand Canyon and may institute an augmentation program in that area, if appropriate. SWCA, Environmental Consultants, Dr. Rich Valdez has been retained by Reclamation to assist with the assimilation of information for this investigation and to recommend an augmentation strategy for the razorback sucker.

Dr. Rich Valdez provided the following reports: Review and Summary of Razorback Sucker Habitat in the Colorado River System" (**Attachment 6a**), "The Potential of Habitat for the Razorback Sucker in the Lower Grand Canyon and Colorado River Inflow to Lake Mead" and accompanying PPT (**Attachment 6a**), and "Strategy for Establishing the Razorback Sucker in the Lower Grand Canyon and Lake Mead Inflow," (**Attachment 6c**). SWCA's goal was to bring together the summary of information on the species, from throughout the basin and known distribution.

Rich said the RBS is found in a variety of habitats and is probably the most diverse of the Colorado River fishes in the system. Of all the species that were that were present when Hoover Dam was constructed in the early 1930s, Glen Canyon Dam and Flaming Gorge in 1962, and the Aspinall Units, the RBS was the only native fish that could sustain itself in the reservoirs. This fish is seen in increasing numbers in the inflow areas of rivers that go into reservoirs, mainly the San Juan in the upper basin, the Colorado River, and now the Colorado River into Lake Mead. The RBS is a spring spawner and has variable temperature requirements and can spawn from about 12° to up to over 20°. They generally spawn in late winter and early spring and even into May and June. They have a terminal mouth and feed on plankton. The synchrony of these larvae with the zooplankton communities and flood plains is the key to this species and they either make it the first month of life or they don't. It is so important to look at the full life history of the species, especially their connection with the flood plain. The absence of large floodplains reduces the likelihood of a self-sustaining population. Access to the lower Grand Canyon, and a it's connection with Lake Mead inflow would be necessary to support all life stages. Possibly fish could spawn in the lower canyon and their young can drift to nursery habitat in the Lake Mead inflow. Bringing RBS into the Grand Canyon above Lava Falls would likely be unsuccessful because there isn't nursery habitat above Lava Falls. In order to keep the young from starving, they need to be within a range of about 60-70 miles of nursery habitat. He concluded with the following recommendations to Reclamation:

- Phase I: Determine the presence of and use by razorback suckers in the lower Grand Canyon;
- Phase II: Assess and evaluate the viability of the Lake Mead RBS population and its linkage to the lower Grand Canyon; and
- Phase III: Determine the appropriateness of an augmentation program for the RBS in the lower Grand Canyon.

Mark gave a PPT "Razorback Sucker in Lake Mead, Lake Powell, and Lower Grand Canyon – What's New and What's Next" (**Attachment 6d**).

- Overview of the RBS timeline  
Reclamation is focused on the 2008 Biological Opinion with shortages and coordinated reservoir operations to examine the potential of habitat in the lower Grand Canyon and institute an augmentation program in collaboration with FWS, if appropriate. The lower Grand Canyon would be defined as from Lava Falls down to the Lake Mead inflow area and continue into the reservoir for 2-3 miles recognizing that the area in the reservoir is important.
- Overview of RBS in Lake Mead since 1996.  
One of the working hypotheses is that turbid waters in Lake Mead are providing some cover for these fish and allowing them to recruit, spawn, and enter the population. They are not static and are moving throughout the lake. It's been documented that fish have moved from both the Las Vegas and the Overton Arm areas, to the Colorado River inflow. That's a distance of almost 80 miles in some cases.
- Lake Powell Study Area.  
Information derived from sampling in Lake Mead studies, motivated the San Juan Recovery Program to study Lake Powell. Most of the sampling was quite different because Lake Powell is primarily clear water. Key findings in Lake Powell revealed:
  - (1) Large stocking program for RBS upstream in SJR but 36% captured without PIT tag,
  - (2) Found one RBS larvae so reproduction is occurring,
  - (3) The age of the fish is 4 to 19 years old, and
  - (4) RBS have been captured in the Lake portion of the inflow.A large number of adults were captured but not many small fish. It's very difficult to capture fish that are less than 300 mm in length. More larvae were captured this year but have not yet been identified and is being done in a lab in New Mexico.

He provided the following recommendations:

- Continue work on RBS at CRI and Lake Mead
- Determine if augmentation is necessary
- Use translocated wild fish (wild larvae from lake population) if augmentation is done
- Integrate all information on fish and foodbase in LGC and CRI
- Expand fish surveys in LGC, especially for RBS
  - Larval and small-bodied fish study
- Potentially sonic-tag large adult RBS and release in Lower Grand Canyon
  - Look at habitat use, movements, and other fish

Proposed future work in 2013 includes; 1) survey downstream of Lava Falls/Whitmore Wash to the CRI area including larval and small bodied fish sampling, 2) conduct a fish inventory, 3) look at the small-bodied fish community, 4) use sonic telemetry to see if captive fish can show what habitats being are used, 5) trammel net to monitor the CRI area as part of the Lake Mead work. By integrating this work with what's being done in the MSCP program twice as much work will be done for half of the monetary investment.

Comments/Concerns

- *Would like Mark/Rich to make a presentation to Hualapai tribe on future work being proposed.*
- *If we get imprinting on a tributary at the mouth of Spencer Creek or whatever, the fish could come back there, but how important is imprinting to the restoration of the species for the whole system?*
  - *A study done by Schultz in the late 1970s/early 80s said all three fish (HBC, pikeminnow, RBS) will imprint but you have to imprint them within the first month. Because there is water at Diamond and Salt, you might want to consider imprinting approach with eggs and then raise the fish in captivity and see what they do.*

- *There is some speculation that the flooded vegetation at the tributary and the inflow area provide some cover to give the fish protection from predation.*
  - *When the reservoir started to head down in Mead, the prediction was the population would also go down and that hasn't happened. They've actually captured more fish and they're seeing strong recruitment from two years ago which is when the lake was about the lowest it ever was.*

**Updates: Goal 3, Tamarisk Beetle, and Riparian Work (Attachment 7a).** Larry Stevens

There are many species in the Colorado River ecosystem but primary concern is for the HBC and a few other key species. There are about 800 plant taxa in the river corridor, possibly 10,000 invertebrate taxa, 350 vertebrate taxa overall. The last two years more than 90 taxa were identified in the river corridor that were either missing, at risk, or status unknown. In assessing which species warranted management attention, several species scored higher than HBC in various ranking systems. For example, the RBS and the Colorado pikeminnow ranked higher than the chub because the chub is in a quasi stable condition in Grand Canyon. Other species that scored higher than HBC include zebra-tailed lizard which is a low hanging fruit in terms of restorability, but it didn't qualify because some of the committee members didn't think it was an important species to keep on this reality checklist. He asked others to provide comments on the following:

- Goodding's Willow – There were 23 sites in pre-dam time when this tree occurred, but now 7 of 18 post-dam sites have been extirpated from more than a third of them. Most remaining are in poor health and there is no reproduction in the system.
- Tamarisk Leaf Beetle – This was an introduction into Utah but moved into the GRCA. The NPS has a fairly substantial program for monitoring the species. There are currently several restoration projects. NPS is doing a pilot project at Granite Camp which is RM 93. This November they will be removing selected tamarisk at the site and in February they will be replanting native species including Goodding's Willow. The NPS and its partners have been monitoring the beetle in the corridor since 2010 and trying to determine the best strategy for restoration in high priority areas (Lees Ferry, Hidden Slough, and Leopard Frog Marsh).
- Kanab Ambersnail – Bill Stewart -some annual monitoring was done in September. Annual reports are not yet completed but will be provided.
- Other Endangered Species – Good report on RBS. The other chubs were contra-indicated in their committee analysis because of the possibility of genetic contamination. There are no restoration plans for the bonytail and roundtail in GRCA in order to protect the HBC or the Colorado pikeminnow in Grand Canyon.
- Zebra-tailed Lizard – In April, 5 male and 5 female Zebra lizards were captured from Peach Springs canyon and released into three different areas at the Diamond Creek dunes on the Hualapai reservation. Monthly monitoring has been conducted and it appears that most if not all have persisted however there is no evidence of reproduction yet.
- Southwestern Willow Flycatcher – Occurrence of SWWF is contingent on the vegetation restoration. The Tamarisk Leaf Beetle has eliminated the primary habitat for the bird in the river corridor. The SWWF is an umbrella species for other neotropical birds in the system indicating they may also be missing.
- California Condor – Condor is an ongoing management concern. Restoration efforts and monitoring continues impacts both inside and outside the park. Mitigation measures are being implemented.
- Missing Mammals – There is no evidence that the Colorado River Otter is actually extinct. There haven't been any recent sightings of either the badger or the otter. Muskrats are occasionally observed in the LCR. Over the last 25+ years there has been a large scale decline in cattails, which is the food source for muskrat. Cattail stands along the river have diminished, but in the past four months, there has been 12 documented sightings of muskrat in Glen Canyon.

Periodic evaluation of the current status and the administrative implications of species of management concern is necessary, not only with native species but also non-natives. There is a need for an integrated process to keep the information coherent, address information gaps, talk about the redirection strategies, etc., including the funding responsibilities. Employing an ecosystem approach in the AMP requires understanding the status and changing distribution of all species. Some species might be important to the structure and function of the ecosystems; some species are important because of their endangered status or the administrative needs around them. There is a need to periodically evaluate the extent of knowledge

and the administrative implications of rare species of potential management concern, for both native and non-natives species.

Larry proposed the following motion in relation to Goal 3:

TWG recommends that AMWG establish a Species of Management Concern Ad Hoc Committee to integrate and regularly present information on native and non-native species that influence CRE structure, function, and management decision-making.

Shane responded that TWG can establish its own ad hoc groups without asking AMWG. This is an issue the TWG has already been tasked with.

Larry said the information isn't integrated, but TWG's doesn't keep an integrated body of information. What are the new non-native species that are coming in, what are the species of management concern, what's the status and distribution of species of management concern?

Shane - The TWG could discuss further and pass along to the AMWG at regular intervals as part of the January annual reporting process and the AMWG meeting in February. As far as ad hoc group, Shane asked Larry if he would be willing to let the group talk more about this before having to do something right now. Larry said his intent was to provoke discussion.

**ACTION ITEM:** Look into the potential for setting up an AMWG ad hoc group on species of management concern to regularly present information on native and non-native species that influence CRE structure, function, and management decision-making.

Helen said she was excited to hear there's new information on the zebra-tailed lizard but questions how it fits with the AMP or whether it's external to the AMP. Larry said he presented the Goal 3 report a year ago in August and talked with Reclamation and because it was an inexpensive and easy project to implement, the decision was made to do the work and to complement the program.

Havasu Report. The NPS publication, "Humpback Chub Translocation to Havasu Creek, Grand Canyon National Park Implementation and Monitoring Plan" (**Attachment 7b**) will be posted to the TWG meeting page. NPS has translocated about 550 HBC into Havasu Creek and have caught approximately 70 untagged wild HBC. Havasu has higher growth rates in Havasu Creek than in Shinumo Creek and the LCR.

**Grand Canyon Monitoring and Research Updates (ASMR/LSMR, Kanab Ambersnail).** Dr. Scott Vanderkooi said the Kanab Ambersnail genetics report by Dr. Melanie Culver is currently being edited at the USGS Science and Publishing Office. The report concludes that the KAS is a distinct population but not a unique species.

ASMR/LSMR - Dr. Martell has taken a new position with the Pacific Halibut Commission in Seattle. Dr. Martell may make a presentation at the spring TWG meeting. Scott gave a PPT (**Attachment 8**) updating progress made with ASMR and LSMR models. In both model runs, the trends are the same. The LSMR model is more sensitive to increases in recruitment. The ASMR refers to 2-year-old fish; the LSMR is able to start tracking fish when they hit 50mm.

- LSMR Preliminary Findings
  - Growth increment data suggest increases in growth rates since ~2001.
  - Trends in abundance between LSMR and ASMR are similar for fish >150mm
  - Estimated natural mortality rates are much higher in LSMR (0.21-0.27) vs. AMWR (0.08-0.13)
  - Greater uncertainty in abundance estimates (as expected) using a length-based model
  - Greater recruitment variability in length-based model.
- Natal Origins/Juvenile Chub Monitoring - There is currently a large number of trout in Lees Ferry the numbers dramatically decreases near the confluence of the LCR. There is more invertebrate drift in Marble Canyon than in GLCA.

- Mainstem Juvenile Chub Monitoring – Downstream of the LCR confluence there are relatively large numbers of small fish but abundance drops off in April. This may be because in the spring the fish are in deeper water or they have moved into the LCR.
- Whirling Disease and Implications
  - Only infects salmonids and *Tubifex tubifex*
  - RBT highly susceptible; BT carry parasite, usually asymptomatic
  - Young, small fish most susceptible; resistance increases with age and growth as cartilage hardens
  - One infected fish can carry millions of myxospores
  - Triactinomyxon production highest at 10-15°C
  - Silt and clay best habitat for *T. tubifex* and triactinomyxon production
  - *T. tubifex* abundance associated with high levels of organic material
  - Scouring flows displace *T. tubifex* and habitat
  - Live removal and relocation of trout increases risk of spreading disease
  - High flow experiments present a very low risk of spreading disease

**Public Comment:** None

**Adjourned:** 5 p.m

**Glen Canyon Dam Technical Work Group Meeting**  
October 24-25, 2012

**October 25, 2012**

**Conducting:** Shane Capron, Chairperson  
Facilitator: Chris Page with Triangle Associates, Inc.

**Convened:** 8:10 a.m.

**Committee Members/Alternates Present:**

Jan Balsom, NPS/GRCA  
Cliff Barrett, UAMPS  
Kerry Christensen, Hualapai Tribe  
Jerry Lee Cox, Grand Canyon River Guides  
Kevin Dahl, Grand Canyon Trust  
Bill Davis, CREDA  
Craig Ellsworth, WAPA  
Amy Heuslein, BIA  
Chris Hughes, NPS/GLCA  
Vineetha Kartha, State of Arizona

Glen Knowles, Bureau of Reclamation  
Marianne Crawford, Bureau of Reclamation  
Gerald Myers, Federation of Fly Fishers  
D. Randolph Seaholm, State of Colorado  
LeAnn Skrzynski, Southern Paiute Consortium  
Larry Stevens, GCWC  
Bill Stewart, AGFD  
Jason Thiriot, State of Nevada  
Michael Yeatts, Hopi Tribe

**Committee Members Absent:**

Charley Bullets, Southern Paiute Consortium  
Kurt Dongoske, Pueblo of Zuni  
Paul Harms, State of New Mexico  
Chris Harris, State of California  
Leslie James, CREDA  
Tony H. Joe, Jr., Navajo Nation  
Robert King, State of Utah

Ted Kowalski, State of Colorado  
Nikolai Lash, Grand Canyon Trust  
Don Ostler, Upper Colorado River Commission  
McClain Peterson, State of Nevada  
John Shields, State of Wyoming  
Randy Van Haverbeke, USFWS

**Grand Canyon Monitoring and Research Center:**

Helen Fairley, USGS/GCMRC  
Jack Schmidt, USGS/GCMRC  
Scott Vanderkooi, USGS/GCMRC

**Interested Persons:**

Mike Anderson, NPS/GLCA  
Mary Barger, USBR  
Peter Bungart, Hualapai Tribe  
Todd Chaudhry, NPS  
Evelyn Erlandsen, State of Arizona  
Dave Garrett, M<sup>3</sup>Research/Science Advisors  
Loretta Jackson-Kelly  
John Jordan, Federation of Fly Fishers

Mark McKinstry, Bureau of Reclamation  
Clayton Palmer, WAPA  
Chris Page, Triangle Associates, Inc.  
Sarah Rinkevich, FWS  
Seth Shanahan, SNWA  
Rich Valdez, SWCA  
Mark Van Vlade, State of California  
Kirk Young, FWS

**Meeting Recorder:** Linda Whetton

**Welcome and Administrative.** Shane Capron

**High Flow Experiment Discussion.**

John asked how the 5,000-8,000 cfs number was established and what considerations went into it. Glen answered that these flows make it easier to move water later in the year. An HFE uses a lot of water, if a low flow is done before and after, less water is released and more sediment conserved. Conserving sediment before the HFE helps to build better beaches, stable flows after the HFE stabilizes and maintains the beaches. Less water will be released in November but water will be moved in February per

WAPA's request. Reclamation did an assessments effect on biological resources. Foodbase and RBT monitoring will be undertaken to better assess the effect of the HFE and the associated balancing.

Concerns:

- *HFEs have impacts on the services and lodges at Marble Canyon.*
- *State of Colorado feels they were told one thing about flow last week and something new today.*
  - *Glen - there were some concerns that not enough technical information was provided at the meeting on Oct. 15 with the basin states so they've been pursuing a follow-up teleconference to provide that information. The intent of the EA consultation process wasn't closely followed.*
  - *Jack - He met with his staff on Oct. 15 and asked for their best scientific advice. Katrina Grantz and Nick Williams agreed to run some additional scenarios. GCMRC couldn't provide a definite response to Reclamation until Oct. 19.*
- *Concern expressed that there is not short-term monitoring to see if tweaks being made by scientists in the hydrograph did any good and if the results can be quantified.*
  - *Jack said there is high reliability from daily cameras. Staff scientists will write short white papers explaining their approaches for making those observations and interpreting the measurements.*
  - *Ted Kennedy said the effects on foodbase should be relatively minimal.*
- *The month of November in the end of 8,000 steady flows. It would be interesting to note when we're back to the 8,000 level, how much accumulated sediment has been preserved, ie.is 8000 cfs accumulating sediment and fairly stable or is it rapidly eroding accumulated sediment?*
- *Trout may be forced downstream to the LCR confluence where they will compete with the HBC .*
- *Did Reclamation consider staying at 8,000 through this time period with the high flow in-between?*
  - *Glen- it never came up. Reclamation staff worked with Western to determine what would be best the best scenario for sediment. The hydrograph selected wasn't much different and would provide some benefit to Western for generating hydropower. The HFE Technical Team held coordination calls over the past 6 weeks and there wasn't a lot of focus on this issue.*
  - *Clayton- in talking with WAPA's operations office in Montrose and the marketing office in SLC, he's unaware whether 5,000 to 8,000 cfs is better for power than a flat 8,000 cfs. His own assessment is that 5-8,000 cfs doesn't differ in power impacts from a straight 8,000 cfs depending, however, on whether that means adding additional water to November and taking it from other months. The impact, whether beneficial or adverse, would be a function of where the water came from. There are some months in which it would actually be a benefit to move from 5 to 8.*
- *Reminder that the 5,000 cfs during nighttime hours was proposed because it would store extra water during a time when hydropower production demands were expected to be low and a drop to 5,000 during the night time hours wouldn't dramatically effect food production in Lees Ferry and cooler temperatures at night, particularly in the shoulder months, low flows wouldn't substantially affect the foodbase. In December and January however, temperatures can drop to freezing and the foodbase is wiped out. GCMRC needs to address some of these issues.*
- *The protocol developed for the EA is an experiment and should have been followed. We are adding an experiment onto another experiment that hasn't undergone the same level of analysis as the HFE impacts considered in the HFE EA.*
- *Concern expressed that we're operating on projections and hypothesis. If flows go down much lower than 8000 cfs and if our ability to prognosticate has a couple of errors in it, we may collect more great data, but we're risking the livelihood of a large number of people and their families who derive their income off of this river.*
- *Private boaters have expressed concerns that they have less experience at the 5,000 level so consider flows to remain at 8,000 constant.*

*The HFE Technical Team will provide recommendations to the Leadership Team, who would then submit a memo to the Secretary. Copies of those documents will be provided to the TWG.*

**ACTION ITEM:** Reclamation will share the TWG's concerns about the HFE to the Technical Team and report back to the TWG.

**Administrative History.** Jason Thiriot a PPT (**Attachment 10**).

A "wiki" website (short for Wikipedia, a user-friendly format aimed at using links) was developed for the GCDAMP program. The site was purchased by the Colorado River Commission of Nevada at a minimal expense and donated to the program. Many stakeholders are linked to the AMP website (<http://www.gcdamp.com>). This is an additional way to share current information with the stakeholders and inform the public on the program's history. It is suggested that approval for using this site be

obtained from the AS-WS Office to ensure there is no conflict between this and Reclamation's AMP website.

Formation of the Administrative History Ad Hoc Group (AHAHG): The following individuals volunteered to serve: Jan Balsom, Shane Capron, Chris Hughes, Bill Stewart, Jason Thiriot (chair) and Mike Yeatts. The charge for the group will be to review the wiki site and determine what needs to be added/modified, and who should be responsible for updating the site, additional links to be established, etc..

**Action Item:** The new "wiki" AMP website information will be provided as part of TWG debriefing with Lori Caramanian to ensure there are no problems with using this site.

### **Two Announcements:**

#### HFE Update. Glen Knowles

As a result of this morning's discussion on a proposed fall HFE, he's been on the phone with a number of people this morning sharing the TWG's concerns. This is the first time the Department has considered a high flow event under the new HFE Protocol so there is a learning curve. The Leadership Team meeting was scheduled to allow Western time to determine what they needed for November. Consequently, a HFE Technical Team meeting next Monday will be followed by a conference call with interested TWG members. A call has been set for the basin states on Tuesday at 2:00 MDT. The Leadership Team will hold a conference call on Thursday for further discussion and possibly prepare a recommendation to the Secretary. In preparation for the TWG call, GCMRC will provide Ted's write-up on impacts to the foodbase and Jack's PPT will be posted to the AMP website. A WAPA representative should participate and be prepared to give information on impacts to power.

#### Operating Procedures Ad Hoc Group (OPAHG) Update. Shane Capron

The OPAHG worked through two major issues; the GCMRC section of the OP that describes GCMRC responsibilities and including a TWG elected vice-chair position. As set up in yesterday's meeting, the Steering Committee Ad Hoc Group (SCAHG) will assist in the transition between the former and newly-elected TWG chair.

#### Socioeconomics Ad Hoc Group (SEAHG) Update. Dave Garrett

The SEAHG is in the process of changing their responsibilities as directed by the Secretary, to identification of those activities that the LTEMP and the EIS process are not covering but the AMP could do through recommending changes to GCMRC work plan. The group has reviewed water, hydropower, general and cultural resource information needs. The group will continue their work via e-mail and present their revised charge at the next TWG meeting.

**Core Monitoring Plan:** This item was deleted from the agenda due to time constraints and will be addressed at a future meeting.

#### **Annual Reporting Meeting on January 22-23, 2013.** Dr. Jack Schmidt

Two sessions will be similar to last year's Knowledge Assessment Workshops. Stakeholders who would like to present should let him know as soon as possible. The tribes will be involved and will report on their monitoring trips. If there are requests for topics for GCMRC, notify Jack.

**Public Comment:** None

**Adjourned:** 3 p.m.

Respectfully submitted,

Linda Whetton  
Upper Colorado Regional Office  
Bureau of Reclamation

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

Updated: Sept. 1, 2011