Glen Canyon Dam Technical Work Group
Meeting Minutes
February 26-27, 2003

Conducting: Kurt Dongoske, Chairperson **DRAFT**

Committee Members Present:

Perri Benemelis, ADWR
Kerry Christensen, Hualapai Tribe
Dave Cohen, Trout Unlimited
Wayne Cook, UCRC
Jonathan Damp, Pueblo of Zuni
William Davis, CREDA
Brenda Drye, So. Paiute Consortium
Lloyd Greiner, UAMPS
Norm Henderson, NPS
Amy Heuslein, BIA
Pamela Hyde, Southwest Rivers
Matt Kaplinski, GCRG
Robert King, UDWR
Dennis Kubly, USBR
Phillip Lehr, Colo. River Commission/NV
Bill Persons, AGFD
Nikola Ramsey, Grand Canyon Trust
D. Randolph Seaholm, CWCB
John Shields, WY State Engineer's Ofc.
Michael Yeatts, The Hopi Tribe

Committee Members Absent:

Robert Begay, Navajo Nation
Christopher Harris, CRB/CA
Cole Crocker-Bedford, NPS/GRCA
Don Metz, USFWS
Nancy Hornewer, USGS
John Whipple, NM Interstate Stream Comm.
Clayton Palmer, WAPA

Alternates Present:

Timothy Begay
Jeff Cross
Debra Bills
Wayne Cook
Mary Barger

For:

Robert Begay, Navajo Nation
Cole Crocker-Bedford, NPS/GRCA
Don Metz, USFWS
John Whipple, NM Interstate Stream Comm.
Clayton Palmer, WAPA

Interested Persons:

Rebecca Cole, USGS NWHC
Jennifer Dierker, NPS/GRCA
Lee Failing, Compass
Helen Fairley, General Public
Denny Fenn, GCMRC/USGS
Steve Gloss, GCMRC/USGS
Glen Knowles, USFWS
Josh Korman, Ecometric
Lisa Leap, NPS/GRCA
Mike Liszewski, GCMRC/USGS
Ted Melis, GCMRC/USGS
Mark Owens, Biomark, Inc.
Dean Park, Biomark, Inc.
Craig Paukert, GCMRC/USGS
Randy Peterson, USBR
Jack Schmidt, Utah State University
Mark Steffen, Federation of FlyFishers
N. Scott Urquhart, Colorado State University
Carl Walters

Recorder: Linda Whetton, USBR

Meeting Opening and Administrative Items

Convened: 9:40 a.m.

Welcome and Administrative Items: Kurt Dongoske welcomed the TWG members, alternates, and guests. All introduced themselves. A quorum was established and attendance sheets (***Attachment 1***) were distributed.

1) Randy said he has appreciated working with the TWG but announced he will no longer serve as the program manager as Dennis Kubly will now assume that responsibility. He will continue as an alternate to Rick Gold on the Adaptive Management Work Group and would also stay on as the vice-chair of the TWG, assisting with preparation of agendas and conducting TWG meetings in the absence of the chairperson, etc. He could also assist with any facilitation or mediation needs.

2) Debra Bills introduced Glen Knowles who will replace Don Metz on the TWG when Don retires.

Review of Action Items from Nov. 7-8, 2002 meeting. Item #3 - change $600,00 to $50,000.

Review of Minutes from Nov. 7-8, 2002 Meeting. Bill Persons and Randy Seaholm will provide their edits to the recorder. Pending corrections and without objection, the minutes were approved.

Action Item: Denny Fenn will provide the TWG with the website address of the USGS FY 2004 budget.

Action Item: Randy Peterson will send a .pdf file of the USBR's FY 2004 budget to the TWG.

Review of Action Items from Dec. 20, 2002 Conference Call. Change $600,000 to $50,000 on top of page 4.

Review of Minutes from Dec. 20, 2002, Conference Call. Bill Persons and Randy Seaholm will provide their edits to the recorder. Pending corrections and without objection, the minutes were approved.

John Shields asked if there were any further developments on the Grand Canyon Trust's intent to sue. He said the 60 days have expired and he knows that Region 6 wrote a letter to the GCT indicating a willingness to meet with the GCT. He said he could provide copies of the Region 6 letter along with GCT's response.

Action item: John Shields will provide copies of the letter Region 6 sent to GCT indicating their willingness to meet with the GCT and GCT's response.

Legislative Updates – Randy Peterson said there has been some movement on the energy bill discussed in Congress last year but no final action. It's his understanding that while the bill was in conference the issue of a national electrical utility policy was still being considered. That issue was a source of great contention with the last energy bill and it's expected that contention will continue during this Congress making it equally difficult to pass an energy bill this year. The HR number that was put in place last year has been superceded and he's not aware of a new bill number.

There are two bills that have been introduced: (1) H.R. 238, "Energy, Research, Development, Demonstration, and Commercial Application Act," which contains some hydropower and (2) S.424. "Tribal Energy Self-Sufficiency Act," which also contains hydropower characteristics but is limited to the Missouri River. It talks about incremental increases from the use of hydropower but doesn't focus on

increasing generation at any specific facility. It's more in terms of increasing the use of renewable fuels by the tribes. For more information, go to http://thomas.loc.gov.

TWG Operating Procedures (***Attachment 2***) – Kurt said the impetus for putting this item on the agenda is that he is longer associated with the Hopi Tribe and in reviewing the Operating Procedures, it's not clear whether the chairperson needs to be affiliated with a stakeholder group. He is now an employee with the Pueblo of Zuni and has had talked with them about making him the TWG alternate. He asked the TWG if they wanted to discuss further and whether or not he should remain the TWG Chairperson. After a brief discussion, it was decided to retain Kurt as the TWG Chairperson and not make any changes to the Operating Procedures.

Humpback chub Ad Hoc Group Update - Sam Spiller said one of the things he asked the AMWG to support when the HBC AHG was established in January was that it include TWG members, GCMRC staff, and also science advisors. He distributed a copy of the attendance roster (***Attachment 3a***) from the meeting held on February 12 and asked if there were other individuals who needed to be included. He reported the Feb. 12 meeting minutes (***Attachment 3b***) were e-mailed to the members as well as posted to Reclamation's web site (http://www.uc.usbr.gov/envprog/amp/amwg/mtgs/03mar28/mtga4_00.html). Sam said that Steve Gloss gave a very good presentation on the status and species. The ad hoc group also developed some action items (***Attachment 3c***). They had a meeting the following day sponsored by the Arizona Game and Fish Department to address future requirements with respect to taking fish and knowing when people (fishermen) would be in the canyon. A concern was raised about the actual status of the humpback chub in that it appears the numbers reported may be incorrect: 1,100 or 2,000. Steve Gloss will review the data and report back to the HBC AHG. Sam said the purpose of the March 12 meeting will be to finalize the recommendations and discuss the biological status.

Steve Gloss announced that Carl Walters would be available this evening if any of the TWG and/or HBC AHG members want to participate in an informal discussion on HBC status and trends.

Target Setting – Ted Melis said that while people have been working on the Strategic Plan and other assignments over the past two years, staff at the GCMRC have perceived an interest in "target setting." As such they asked Josh Korman, Carl Walters, and Lee Failing to make a presentation at today's meeting on a proposed way for the GCMRC to assist the TWG with the concept of setting targets, the idea of trying to establish ways of evaluating how well the program elements are working/not working with respect to the management objectives and information needs.

Josh Korman said he and Carl got involved with the AMP in 1998 with a conceptual modeling exercise. There were three objectives for developing that model: (1) highlight the data gaps, (2) use the modeling exercise as a policy screening tool, and (3) use the model as a data tool. Their presence today will be an extension of that original conceptual modeling exercise and the need for target setting. Josh said he met Lee Failing through work with EC Hydro. He was working as a modeler on a water use planning process similar to what is being done by the TWG but on a much smaller scale. Lee would take the results to the stakeholders to help them make a decision about different flow alternatives. He found her to be really effective at the methods she was using. She is a mechanical engineer and is going to present a plan on how it could be organized and Carl will provide a demonstration of the Grand Canyon model because that will be one of the primary tools to be used.

Lee Failing said the reason they were asked to make a presentation to the TWG was based on a need to establish quantitative targets to guide management and assess progress over time. She proceeded with a PowerPoint presentation, "Multi-Attribute Evaluation of Key Resources in GCDAMP." (***Attachment 4a***).

When asked where the targets come from, Lee said that once the management alternatives have been determined, then the targets can be defined. At that point, some modeling has been done or there are

some empirical results that would suggest: (a) it's a reasonable target and there is some scientific basis for being able to achieve it, (b) that the set of targets collectively are not completely in congress, or (c) the stakeholders have decided it is desirable to do. She said one has to choose the management alternative based on comparison with other alternatives.

Perri Benemelis questioned how the reliability of information for one attribute influences the outcome. For example, the attribute for rainbow trout is abundance. Since there is a fairly large population of RBT, the survey data would probably be reliable but because it is being compared to HBC (really small numbers in a huge system), the reliability of those numbers is questionable. Lee said she really oversimplified for this presentation but agreed that uncertainty creates problems with the numbers. She said there are different ways of dealing with the uncertainty and she would like to have some detailed discussions on how to do it.

Carl Walters said that most of the TWG were involved in the TCM model. In fact, the initial development of that model fit into a series of workshops and was presented in a slide show. He said if one is going to build a computer model that looks at the past and future of the Grand Canyon ecosystem, there are a million different ways to do that: look at one tiny backwater area and every single blade of grass or look at a much larger scale time perspective. There is no way to get started without bringing a group of people together to determine what is wanted and if there is a program that could help them. He proceeded with a PowerPoint presentation entitled, "Grand Canyon Ecosystem Model" (***Attachment 4b***).

Carl said the model has a real way of clearing the air about the target, variables, uncertainties and research needs. The models are easy to use and often there emerges over some period of time a shared vision about how a system should be managed and how to live with the tradeoffs. What they found happening in some of the modeling exercises is there develops a shared vision about policy alternatives that are win-win alternatives and might end up doing better for everybody. One of the key ideas behind the modeling is being able to play with the model and see if one doesn't just get lucky. Virtually every exercise they've been involved with on major riparian ecosystems and other large ecosystems around the world have resulted in a shared vision. He feels the shared vision might scare a lot of people, for example, going back to very much higher fluctuating flows and letting the river go down to about 3,000 cfs and up to 25,000 cfs. The model says it would pump a lot more sand up on the beaches rather than stirring it up and carrying it down through the system. It would end up being better for beaches. It's badly needed for the rainbow trout population. That population is grossly overstocked and the densities are about five times higher than they ought to be. It would probably keep the rainbow trout away from the chubs in the lower part of the system save having to go in there and electroshock them. The idea behind these models is to be able to stand back from what has happened in the system and move progressively toward more restrictive policies with respect to water management, collimate the most steady flow and see whether or not the policy in the canyon has got the channel too narrow or whether broader alternatives ought to be considered.

Carl said that there is still a lot of work that needs to be done on the model. They haven't had time to bring in the most recent time series estimates on humpback chub population trends or the most recent rainbow trout assessments so there is a lot of detail work that needs to be done. Carl explained there is an interface within the computer that is reaching down inside the computer to two things: (1) one is a bunch of huge spreadsheets of data that were put together on the historical physical characteristics of the river and to some degree on what they've been able to put together on historical biological characteristics of the river. These are essentially the forcing inputs to the interface. The computer reads in very complicated riverware simulation results from the big hydrologic walls that are used to plan water management release schedules up and down the Colorado basin. It brings in economic evaluation data from the power system as well. (2) A lot of rules were programmed into a language called visual basic that expressed what they think are some of the process linkages between the big physical spreadsheet databases and some aspects of the ecology of the system. Inside the model everything in the canyon

gets divided into 12 reaches and the canyon bottom is divided into a depth layers going up outside of the channel along each of those and a lot of the calculations are done that way. To look over time, they try to recreate abundance over a 50-year period. He then demonstrated how the model ran. The model is capable of looking at in considerable detail in space that is down the river by river reaches and over time. In some ways the information is too complicated.

TWG Questions/Concerns:

- With a lot of other issues (budget, HBC, TCD), what is the best timing for this process?
- Can the process help with the HBC?
- Need for a shared vision in assisting with policy decisions
- Look at tradeoffs for resources
- Possibility of holding a one-day target setting workshop

Asian Tapeworm - Steve Gloss introduced Rebecca Coles. She is a parasitologist with the National Wildlife Phelps Center which is an organization in Madison, Wisconsin that works on fisheries and wildlife diseases all around the country. They've been doing some work in the last several years to try and shed some light on the Asian tapeworm in the Lower Colorado River. Rebecca distributed copies of the paper, "Parasites of Native and Non-native Fishes of the Little Colorado River, Grand Canyon, Arizona" (***Attachment 5a***) and then made a PowerPoint presentation (***Attachment 5b***).

Physical Component of the Summer 2000 LSSF – Ted Melis said the context of Jack Schmidt's presentation would be on the integrated physical science results from the Low Steady Summer Flow (LSSF) 2000 Experiment. The two major results of that project included: (1) a backwater study report which is currently being reviewed with a final to be released shortly and, (2) the final overall report which GCMRC is currently reviewing and should be finalized in spring or summer. Several groups who have been involved with monitoring and research of sandbar storage issues over the past decade or longer came together under an integrated proposal in 2000 which Jack led. Results will be from at least two components of USGS involvement as well as data contributed by Northern Arizona University and Utah State University.

Jack Schmidt gave a PowerPoint presentation entitled, "Effects of Low Steady Summer Flow and Habitat Maintenance Flows in 2000 on Sediment Transport in Marble and Upper Grand Canyons" (***Attachment 6***).

Update on Integrated Coarse-Sediment Monitoring and Modeling – Bob Webb said he would talk about what he's been involved with since he started doing research in the Grand Canyon. He proceeded with a PowerPoint presentation, "Modeling Debris-Flow Sediment Transport in Grand Canyon" (***Attachment 7***).

Flow Modeling Graphical Interface – Ted Melis said there were two major modeling efforts that went on during the GCES phase, one was referred to as STARS which was an attempt by the Bureau of Reclamation to develop a stage and travel time prediction model for the Colorado River below the dam that was led primarily by Denver Office (Tim Randle). It was fairly complete and functional by 1987. It turned out that it didn't do a very good job of predicting travel time but did a good job of predicting stages. Later in PhaseTwo the USGS came in and made another effort to get the travel time concept for modeling down. Steve Wiele was able to close that loop in 1996 and they verified those models and results during the 1996 flood which resulted in both a travel time model and a stage prediction model but two separate models developed by two separate agencies at two different times. They were both functional and considered operational but people couldn't access them readily. They decided to pursue development of a graphical user interface (GUI) in 1999 and Ecometric was able to assist. The goal was to come up with a GUI that combined both of the models in one package, could be run on a laptop

computer, and would be available for any stakeholder or any member of the general public. The goal was that a discharge from the power plant could be routed through the system, stages could be predicted at hundreds of locations through the system, and the travel time of the diurnal wave could be estimated actively throughout the whole system. Ted introduced Josh Korman who gave a PowerPoint presentation (***Attachment 8***).

New PIT (Passive Integrated Transponder) Tags – Steve Gloss said PIT tags have been used for about 15 years and now the technology for marking fish has advanced considerably beyond what GCMRC is using in the canyon and so they wanted to ask Mark Owens and Dean Park from Biomark, Inc., to make a presentation on the newest technology. Steve said if they implement the new tags for this year, it will cost around $60,000. Steve said Mark and Dean spent some time yesterday with GCMRC's fishery cooperators.

Mark explained that a PIT tag is a micro circuit encapsulated in a bioglass capsule and is typically implanted inside the animal. Biomark is essentially the marketing and research aspect of the manufacturer's effort to distribute the technology. It's also being used in the companion animal market.

Following the presentation (***Attachment 9***), Steve asked the TWG if they would approve the purchase of the PIT tags for the GCMRC. There was a general feeling of concurrence among the members and Steve said he would place an order with Biomark.

Adjourned: 5 p.m.

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Interested Persons:

Nancy Coulam, USBR
Jennifer Dierker, NPS/GRCA
Helen Fairley, General Public
Denny Fenn, GCMRC/USGS
James Garrison, AZ SHPO
Steve Gloss, GCMRC/USGS
Ann Howard, AZ SHPO
Glen Knowles, USFWS
Lisa Leap, NPS/GRCA
Mike Liszewski, GCMRC/USGS
Ted Melis, GCMRC/USGS
Craig Paukert, GCMRC/USGS
Randy Peterson, USBR
Mark Steffen, Federation of FlyFishers
N. Scott Urquhart, Colorado State University

Recorder: Linda Whetton, USBR

Meeting Opening and Administrative Items

Convened: 8:15 a.m.

Welcome and Administrative Items: Kurt Dongoske welcomed the TWG members, alternates, and guests. All introduced themselves. A quorum was established and attendance sheets were distributed.

Target Setting Workshop – Kurt asked the members what direction they wanted to give GCMRC about holding a target setting workshop. He questioned whether they wanted to do a pilot workshop in conjunction with a TWG meeting to see how doing resource comparisons and making tradeoffs would work. Based on that outcome, a decision would be made whether to have a more involved workshop and possibly invite the AMWG. After some discussion, the TWG agreed the model should be updated and a one-day meeting should be scheduled around the May TWG meeting. Linda will send an e-mail message to the TWG requesting their availability for a workshop/TWG meeting during the month of May.

Action Item: Linda will send an e-mail message to the TWG polling them for their availability at a combined workshop/TWG Meeting in May.

Core Monitoring, Research, Experimentation – Steve Gloss said because of the uncertainty around the budget, experimental flows, and some other things, the GCMRC thought it would be a good idea to get a sense from the TWG of what their expectations are about core monitoring - what has to be available from core monitoring with respect to making decisions. The GCMRC has been involved in core monitoring for the past couple of years but would like to get a better sense of how people feel about it. This would also coincide with a science advisors workshop being held on March 21-24. He said their approach would be to do a short presentation of what they're doing in core monitoring using the FY03 work plan. They have asked Scott Urquhart from Colorado State University to make a presentation that talks a little bit about the assumptions that need to go into monitoring programs from a statistical sampling point of view and from a reliability of information point of view - what kind of inferences are appropriate/ inappropriate to make about the status and trends of resources depending upon the time of monitoring, design, etc. He proceeded with a PowerPoint presentation (***Attachment 10***) and then asked Ted Melis to present the last four slides.

Mark Steffen asked how often the aerial overflights are conducted. Ted said they have been done annually for support of the entire program, and not just the FIST. He went on to explain that the FIST requires a fairly specialized type of overflight for the 11 reaches, approximately 10% of the whole river system, and must be done once every two years. Ted said they are developing some digital terrain models from the dataset. Mark asked if they needed four days of 8,000 cfs flows. Mike Liszewski responded that in the last couple of years they collected for 10 days and needed all that time to complete the aerial overflights primarily because they drastically reduced the time available for the aircraft to actually fly over the canyon in order to minimize shadowing. The annual overflight of 10 days is a fair number. For the special flight Ted was referring to as the FIST, only a couple of days are needed. Mark questioned if it was something that had to be done every other year. Mike said that question has been raised before and is being addressed as part of the remote sensing initiative. However, he said that not all the data needs to be collected at the same time. Mark said that in the past there have been lower levels (5,000 cfs) that were required to do the overflights and it's pretty obvious of what it does to the river at that level. It also prevents anything from living above 8,000 cfs level. Mike said that about four years ago they deviated from the strictly 8,000 cfs level to actually divide into two and how they did that was to say in low volume years, it would be 8,000 cfs and in high volume years, it would be 15,000 cfs. Ted said the basis for that came from a meeting held in 1997 in which the foodbase people that during the wet periods it was an artificial treatment. So they asked what could specifically done and the foodbase people said that in periods where the hydrology drives weekend operations to go down as low as 5,000 – 8,000 cfs, it doesn't really matter because the system is already being hammered but during

wetter periods where the flows would normally never go below 10,000- 12,000 cfs, they decided to look at the hydrology and over the course of 10-20 years of overflights, will either use 8,000 or 15,000 as baseline rather than artificially imposing something on the ecosystem that is only being done to monitoring. Mark said he feels it is important to keep in mind that whenever the river is left at 8,000 cfs or lower for longer than an overnight period or a short period, there is going to be serious damage. He said if they are doing it for the entire weekend simply because there is no power generation, that's a problem too but since it's being done for aerial photography, it is going to cause some problems. Steve said that not all staff at GCMRC share the same opinion, some people feel they need to develop an attitude because we're going to manage the river in a way that it recognizes this capacity to produce things for us in terms of aquatic foodbase and so forth and ought to be actually set at that level of 5,000-8,000 cfs and anything that happens above that is a bit of luxury because it's almost inevitable that we're going to into an experience like we are now in a 8.23 maf release years and it's going to be this way for a long time and that's going to really set the limits on what this system can do in terms of aquatic productivity. Steve said he took exception that they are doing damage to the system. Mark said that while they may not be doing damage to the system, there will be increases in the variables which cause increases in the overall carrying capacity which will vary throughout time and you will have damage occur if you increase the carrying capacity and then you drastically reduce it back to where you want it to be anyway. There will be that impact, that fluctuation of overall biomass in the ecosystem.

Jeff Cross commented there is a lack of focus on recreation and a limited focus on cultural resources. They are priorities in the Strategic plan but he doesn't see them reflected in core monitoring.

Scott Urquhart said it's very important to understand that monitoring is not necessarily research and when you get researchers involved in monitoring, often times they lose sight of the monitoring function and get too involved in the "how" and "why." In the university community, they teach people how to do research and in that context, how and why is very important. Monitoring is concerned with what happened and not as much why it happened. He mentioned that in some earlier contract work with the GCMRC, Mike Kearsley did some pretty intensive studies of vegetation that required a lot of time at a single site and resulted in the development of a vegetation index. It's something that can be done quite quickly and effectively and overcomes a lot of the variation problems. Adaptive management may require both of these to some extent but managers need to look critically at what research does in the sense that it can be linked and can it be managed. Scott proceeded with a PowerPoint presentation (***Attachment 11***).

Dennis said he doesn't believe there is good communication between scientists and managers for assessing and managing risk. He thinks the managers suffer the risk but the scientists tell the managers how much it costs to increase or decrease that risk. He asked Carl if he had a similar portrayal that Scott has on the vegetation for his analyses, in other words, power protection over time to assess trends for managers, how many years it will take to detect a certain amount. Carl said they set up the program to do basically the power calculations under an alternative design and evaluated a lot of the alternatives and designs but to do that you have to have as pre-sample. They got burned pretty bad by BioWest. The variance in the historical data was much lower than it should've been due to systematic fine scale selection of sample sites. They were running down the river and went where they could find fish and that reduced the variance. They tried to correct for that but they didn't realize just how efficient the boatmen had become in finding fish. The variance turned out to be one-fifth to one-tenth of what should've been source sample sites prior but was grossly under estimated, the sample site requirements were also grossly under estimated.

NPS Monitoring Program – Lisa Leap said she would report on what the NPS has been doing since 1992, their ability to identify change, some of the techniques they've used, and some of the implementations they've done based on their observations. She gave a PowerPoint presentation entitled, "Cultural Resources Monitoring Grand Canyon National Park" (***Attachment 11***).

Norm asked what the status was on the Historic Preservation Plan (HPP). Lisa said the Programmatic Agreement (PA) Group drafted a HPP in 1997, but it had not been finalized and the Protocol Evaluation Panel (PEP) called for a number of subplans that would comprise the HPP. Norm said he thought that when Ruth Lambert was working for the GCMRC, a number of components were sent out and the PA was going to get started on those. Lisa said that she didn't think anything had been done but thought they were working on a consultation plan and research design. Nancy Coulam reported that the HPP is just about complete. The first component of the new HPP will be Loretta Jackson's tribal consultation plan. The tribes have been working very hard on completing this as part of the HPP and the AMP Strategic Plan and they are on the ninth draft. It will be distributed to the federal agencies for their review, then to the other stakeholders in the AMP (because this will also be an appendix to the Strategic Plan.) Loretta Jackson is in charge of the consultation plan and should have it done by September. The next component is the research design, and it was jointly contracted by GCMRC and Reclamation. It is being reviewed now by the PA Signatories and the author is actually attending the TWG, Ms. Helen Fairley. The data plan called for by the PEP has been integrated into GCMRC's planning process for their computerized database and the archaeological sites are being plotted on a GIS data layer, along with various flow lines. This base map should be completed by mid-summer. The only major component of the HPP will be the treatment and monitoring plan. This could not be contracted until the research design was completed, but it should be contracted during FY04. The only other component is a public outreach plan, which we had hoped to integrate with the AMP plan.

Matt Kaplinski asked what a SHPO was. Nancy Coulam responded that the Arizona SHPO was in the room, and it means State Historic Preservation Officer. They represent the interests of the state in historic preservation and review agency compliance. In addition to SHPOs, there are THPOs, or Tribal Historic Preservation Officers. THPOs assume the responsibilities of SHPOs on Indian land. Zuni, Navajo, and Hualapai all have THPOs who have the authority to make determinations of eligibility of sites for the National Register and to negotiate how to resolve adverse effects of undertakings on historic properties.

Matt also said an economic analysis of recreation, both of the trout fishery and the river rafting industry, is missing from the program. He suggested it may be worth looking at if the TWG proceeds with a target setting workshop.

Mechanical Removal and Beneficial Use – Steve Gloss said the second mechanical removal trip would be coming off the river tomorrow. They electroshocked and euthanized about 2,000 rainbow trout on the second trip compared to 4,000 on the first trip. They are going to be delivering 11 15-gallon carboys to the Hualapai Tribe tomorrow for their continued use in their organic gardening. They have distributed the ton of material they provided a month ago in composting piles in Peach Springs as well some of their gardens and also distributed some of the material in the gardens they maintain down by Sedona at property owned by the Dansen family. They have at least two or three more tribal members who want material for their gardens out of tomorrow's trip. Everything seemed to go fine on the second last trip. The numbers are roughly half of what they got the first time which suggests that there is some immigration of fish back into this area because they are tagging fish upstream and the numbers of the immigrating fish seem to be relatively small so this handling of the catch is about what they predicted based on a standard depletion approach. It will continue to go down on the next trip which launches fairly soon. It's been pretty demanding for the GCMRC biology program. They are going to take a three-month hiatus and resume trips in July-Aug-Sep and see what re-population is around LCR at that time. Rain hasn't caused a lot of turbidity but has enhanced the electrofishing.

The stranding project is being done by EcoPlan. They are monitoring stranding in the entire 15-mile reach between the dam and Lees Ferry two days a week. They switch the times they do their observations. Right now they're averaging 6-7 dead fish a week so over the first six weeks of the

fluctuating flow experiment, they estimate they have killed 38 rainbow trout. There are roughly 135 additional fish that get stranded in pools but they are pools that aren't de-watered to the extent where there is any mortality so there is some additional isolation of fish. The average size is 15" and most males and females are ripe. There is also some indication that scavengers are getting some of the fish.

Carl Walters reported that this program, along with better statistics, is showing two surprising things: (1) the total number of fish in the canyon is much less than was previously estimated, and (2) there is a much stronger gradient of fish abundance in the canyon than was thought. The older picture was that there was a changeover going down the canyon from native to non-native fishes but there was still a lot of fish. You get below the LCR and the total number of fish of all kinds is less than the number between the Paria and the LCR. There is a huge drop in productivity. The aquatic system really is living on the primary productivity from the Lees Ferry Reach and some variable productivity contribution between the Paria and the LCR.

Matt added that they have gone in and surveyed the Reds and found them in the water at 5,000 cfs all the way up to 18,000 cfs and are starting to get active on the gravel bars and coming up into the higher end of the fluctuations. If they're getting up there in a couple feet of water at 20,000 cfs, then they could come completely out of the water at normal operations (6,500 – 9,000, or 12,000 cfs).

Mechanical Removal Update. Steve Gloss said his staff has been very busy with the mechanical removal. They haven't started doing any stomach analysis but thinks that activity will begin in April. He said 4,000 stomachs were taken on the first trip and at last count they have about 6,000. They won't be doing detailed diet analysis on all of those but will look at every one to see if they have any native fish in them. Steve added there were 20 HBC taken on the second trip and almost all were juveniles.

Upcoming Agenda Items. Kurt asked if there were any agenda items for the next TWG meeting. The following were provided:

- 2004 budget and USGS overhead
- Protocol evaluation panel will be ready for presentation
- On January AMWG agenda on progress of Oracle database – do in next several months
- present preliminary canyonwide vegetation map done last year
- ACHIO update
- GCMRC - remote sensing initiative and finalizing all reports and a summary report
- HBC AHG report

Adjourned: 12 noon

Next TWG Meeting:

May 28 (1-5 p.m) and May 30 (8-noon)

Location:
Bureau of Indian Affairs
2 Arizona Center, 400 N. 5th Street
12th Floor, Conference Rooms A&B
Phoenix, Arizona

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General Key to Adaptive Management Program Acronyms

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