Budget Ad Hoc Group (BAHG) WebEx/Conference Call
June 12, 2014 (10a – 12:10p, MDT)

TWG Triennial Budget Input FY 2015-17
Meeting Minutes

BAHG Chair: Shane Capron

Participants:

BAHG Members:
Cliff Barrett, UAMPS
Shane Capron, BAHG Chair
Kerry Christensen, Hualapai Tribe
Kevin Dahl, NPCA
Dave Garrett, Science Advisors
Chris Hughes, NPS/GLNRA
Leslie James, CREDA
Vineetha Kartha, State of Arizona
Glen Knowles, USBR
John Jordan, TWG Chair
Jason Thiriot, State of Nevada

TWG Members & Others:
Charley Bulletts, Southern Paiute Consortium
Evelyn Erlandsen, ADWR
Jerry Myers, Federation of Fly Fishers
Tony Joe, Jr., Navajo Nation
Dave Rogowski, Arizona Game & Fish Dept.
Kirk Young, USFWS

USGS/GCMRC
Lucas Bair, Helen Fairley, Ted Melis, Barbara Ralston
Scott Vanderkooi

Purpose of Call: Identify important concerns in the FY15-17 Triennial Budget and Work Plan (posted 6/6/14 http://www.usbr.gov/uc/rm/amp/twg/mtgs/14jun24/index.html) in preparation for the next TWG meeting.

Questions/Concerns:

- Because the TWP is a very large and detailed document, will the TWG have read/understood it before the next TWG meeting? Will they be prepared to develop a budget recommendation at that time?
- Project A.5 – If POAHG fund is reduced, can those monies be transferred to GCMRC?
    - Glen: Yes
- Project 13 – Can Creel Survey work be combined with AGFD work to avoid asking same questions/hiring people/increased travel costs?
    - Lucas will coordinate efforts with AGFD.
- Project 13.1 – How does this relate to the NPS total value work? The NPS work is doing a broad look at resources below GRCA, specifically vegetation, beaches. Project 13.1 is focused more on direct use values, more along the lines of recreational activities in the Canyon, time spent, and how flows are valued.
- Project C5, NFCCF – If there's a project that needs funding and isn't on the list, are we going to be allowed to use those funds in this budget?
    - Glen: Yes
- Projects 5.1.7, 5.1.8, and 5.2.4 – Assume we'll be looking for funds outside the AMP, and get from WAPA?
    - Scott: Had submitted that WAPA and belied Ted K. had submitted to Clayton Palmer for WAPA funding. Not sure of status. WAPA is looking for ways to coordinate foodbase work being done at Flaming Gorge so those are ongoing discussions. Ted and Jeff are proposing a comparative study of foodbase downstream of Flaming Gorge/Green River so we've proposed to continue work in GLCA and GRCA and some outside funding from WAPA in collaboration with Scott Miller in Green River to better understand the aquatic foodbase in Glen Canyon.]
- Appendix 2-C, page 456 – Have you taken out the projects that are proposed out of the NNFFC?
    - Scott: Go to project 6 and 7 you'll see 6.2, 6.3, and 6.6 listed in the column of other BOR sources and would be in the NFFCC. We took a first cut at listed them as high priority. That's our recommendation but if others see how we've categorized, please let us know. There are some projects that are in FY15 with $0 and those are projected to go in outyears. We're still going to resolve the FY16-17 budgets and narrow down to available funding. We haven't had the time but

there are some uncertainties with LTEMP and other things. Some fish projects as an example, project 8. In 8.3., 8.4, 8.5, those have totals in recommended in FY15 and recommend funding in FY16-FY17. Refer to Chapter 2 Introduction on projected funding written by Dr. Schmidt.]

- Page 42 – Why is this statement here: **What management strategies should be employed to maintain a high quality rainbow trout fishery in Glen Canyon while protecting, and potentially recovering, the endangered humpback fish community in Marble and Grand Canyons**?
    - Scott: Jack's interpretation of Secretary's guidance on fisheries issue. This is in introduction but GCMRC could revise.
- Introduction, page 38 – We shouldn't be pointing back to legacy documents that may be no longer used. The Monitoring and Research Plan and Strategic Plan are out of date and the Draft Core Monitoring Plan hasn't received DOI support. #8 should reference the DFCs memo dated April 30, 2012. Consider reversing the order of the documents.
    - More discussion needed. Scott will talk with Jack upon his return to the office. Scott will provide the word version of this section so that Shane Capron can offer written recommendations for changes.
- In the past Loretta Jackson-Kelly and Peter Bungart had raised concerns about how responsive has this program been to warm water moving up from Lake Mead, and other research that could be done in the lower river?
    - Scott: We're proposing to add some additional work in Western Canyon. Currently we've only had one trip that's gone down below Diamond Creek so we're adding a spring and fall trip to continue electrofishing surveys and a good way to detect if non-natives are moving in.
    - NPS and BioWest are doing increased sampling in that area outside the work AGFD will be doing.
    - BOR (Mark McKinstry) has been leading that effort for BOR for two years and is a 5-year contract.
- Project 13.3 – Can you tell us about the methods?
    - Lucas: This project is attempting to organize and compile all the science coming out of the program into a comprehensive structure but adding some economic layers to the decisions, looking at some of the costs that occur within the program and as far as management decisions to reach goals. There are some specifics in the project so incrementally start with HBC and trout and management decisions and M&R that take place in that realm,(1) we have some predictive models that help us evaluate the management of those resources,(2) significance on resources, and(3) overarching mandates that provide clear and specific goals – HBC recovery, past research there is value for native fishes in Colorado River, CRE, GRCA. We felt it was important to prioritize and specifically how to most cost effectively meet HBC goals – including the Yackulic model. The plan is to incrementally add in other management variables.
    - Vineetha: Are you developing a tool for TWG and AMWG or a tool for GCMRC to make decisions in the future?
    - Lucas: It's a tool on how different management actions affect the resources and evaluate the uncertainties in the resources themselves. Processes in the canyon and be more cost effective, maintain and improving valuable power at GCD, establishing and improving other ecosystem attributes. It helps both the management of the resource and helps us understand where we can put our money in monitoring and research and cost effective management of the resource. GCMRC can make that language more clear. People should call or e-mail me with questions.
- Project 11.3 - We had previous meetings about Goodings willow and how this is going to resolve concerns and what is the project area?
    - Barbara: This is Retrospective Anaylsis project so it's using the data from the NAU sandbar monitoring program. They've been collecting topographic information on 50 sandbars for about 22-23 yearss and we're proposing to use that information as well as the guilds or vegetation groups we've identified relative to hydrology or physiological traits that we find along the river corridor and look at historic hydrology and try to rebuild the vegetative history so we can understand how any one of these guilds may respond to different annual hydrographs from GCD.

We would do 20 of those 50 sandbars. We would also be using the repeat photography done on those sandbars and what that vegetation was in any particular year and would be selecting 10 sandbars above and 10 sandbars below the LCR.
    - Dave G – goes back to Barbs and Ted's work – backwater areas, albeit focus was different. Have you evaluated those databases as being potentially helpful in areas you're pursuing?
    - Scott: I'll follow up on that with Ted and talk with Barb about that. A couple of attempts of using existing data and we should look to do that as much as possible.
- Project 10.2 - shows partial funding in this year and some going forward. The project is about 1/3 to not be funded this year. What would not be funded and what's the impact?
    - Ted: There is a critical need for ¾ time student to help with development of protocol to use. With the help of a student, this project could be completed in FY15 with full funding. There is $95K funded for staff and another $54K is unfunded.
- NFCCF – Shane: So $364K is coming out of that fund in FY15. I'm wondering how loose is this fund for use to fund other projects and getting back to John in Project 10 looking for $55K. In FY15 the budget is $824K which I think is minus the $364K that's being promised to the projects in the list.
    - Scott: Roughly $500K is from EFF is directed into this each year and it goes up with CPI. This fund was already tapped to cover sequester reductions so the proposal would be to FY14-15 the remainder would be $824K in Fy15. I'm cautious about this. Glen had mentioned it would be possible to fund native fish studies and we proposed some use. In my mind this fund is to be built up, what that level should be, but should be sizable if NNF needs to occur in the future. I'm very cautious about raiding this and relying on it every year. In the event that conditions are met that removal is needed, we need a pool of money to draw from.
    - Shane: The $824K is after taking out the $364K.
    - Scott: If money can be used from the NFCCF, the FY15 budget is balanced. FY16 and FY17 aren't balanced yet. Those budgets for 16 and 17 will not be available to the TWG at its June meeting.
- GCMRC Support of LTEMP and use of AMP funds- On last AMWG call, Jack said he would provide information on how much power revenue funding is being used for GCMRC staff to support LTEMP EIS work. How much work in 15/16 will be done to support LTEMP as there is no line item for that? What in this workplan cannot be accomplished if staff are working on LTEMP?
    - Scott: GCMRC will provide that amount at the next TWG meeting.
- Science Boat Trips – are back up and running. Award of the new contract was contested by previous contractor. The protest was denied and was reviewed by USGS and their solicitor's office. The former contractor can still take to a higher level and go to GAO. If that occurs, a work stoppage will not happen.

Action Items:

- BAHG/TWG should send additional questions or concerns on FY15-17 TWP to John, Shane, and Linda for discussion on the next BAHG call.
- Scott will send an Unfunded Projects List for the members to individually prioritize for discussion on the next BAHG call.
- Scott will send a word document of the GCMRC introduction section to Shane for comments.
- GCMRC (Jack or Scott) will determine how much power revenue money is being used for GCMRC staff to support LTEMP EIS work and report at the next TWG meeting.

Next BAHG WebEx/CC:
Wednesday, June 18 2:00 – 5:00 p.m.

Call ended: 12:10 p.m.

Budget Ad Hoc Group (BAHG) WebEx/Conference Call
June 18, 2014 (2-5p, MDT)

TWG Triennial Budget Input FY 2015-17
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Cliff Barrett, UAMPS
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Lucas Bair, Helen Fairley, Ted Melis, Barbara Ralston
Scott Vanderkooi

Purpose of Call: Review ranking order and further discussion on TWP. Flesh out any questions. A brand new TWP sent out a new version. The revised draft and notes were sent out as well.

- Changes to the TWP. Scott said the main changes are in the appendices. There were two errors and also added budgets for FY16 and FY17 and in the same format as the FY15. There were minor changes made in the introduction. Noted some text for the figure captions in Project 5 so that was fixed. The information at the end of each project has been summarized and in a convenient form, but it's a full ask. GCMRC didn't attempt to make any recommendations on anticipated funding. The budget is around $8.8 million so it's roughly $2 million over.
- Comments were sent in by Bill Stewart, John Spence, and Chris Hughes. John Jordan and John Hamill provided their rankings on the Unfunded Projects List. (***Attachment 1***)

Given the amount of work required to review and approve the TWP, Shane proposed the following structure for the June 24-25 TWG meeting:
  - Keep first day as arranged on the agenda.
  - The BAHG report will be short and focused on process.
  - SAs report as described.
  - After lunch, Glen will provide an update on the Cultural Program budget.
  - There will be presentations on each project by the PIs (10-15 minutes each). There won't be time to discuss each project so concerns will be captured and addressed on the second day of the meeting. Scott said many of the PIs will be in the field but he and Jack could provide overviews prior to each presentation. He questioned if having 3 hours of stock presentations would be beneficial to the group. Clayton added that having an explanation on Project 10 would really help him better understand that project. Leslie suggested a good starting point for the PIs would be to provide a justification or summary of the project, why it's needed, linkages to the DFCs, hypothesis, and what hoped to be learned in the timeframe with the associated dollars.
  - Need for input from the CRAHG. They won't have time to meet before the TWG meeting but will try to meet over the course of the 2-day TWG meeting and provide something to the TWG.
- Unfunded Projects – The group would discuss the merits of these and work toward developing a recommendation for FY15.
- Shane identified three processes for getting to a recommendation:

1. Educate everyone and empower stakeholders to make a recommendation. People are struggling with this work plan and need the PIs to explain what the main parts are, field work, and major methods to be used.
2. Evaluate and have a discussion together and figure out and come to agreement on where we need to be, and
3. Tackle the unfunded projects because we'll need to do tradeoffs in other projects. Hard to evaluate the unfunded list and will need to prioritize. We will need to also look what is funded in FY16-17 so we don't start a project and then don't have funding to complete.

- It would be important to focus on the newer or controversial things and avoid reviewing things that are already well understood by the TWG.
- Scott will work with the PIs and determine which ones can be present at the meeting and which ones may need to join by conference call and also cluster presentations around specific areas (biology, ecology, etc.). There are some subtle differences in some projects and Scott said it would be really help staff if there were questions, comments, or guidance the TWG could provide prior to the TWG meeting.

Discussion of Unfunded Projects

- **Project 4.2 - $174,000**

Helen: it's a bit confusing between the amounts of $123,624 and 174,000. In this project there are two elements, 4.1 on additional mapping and research, 4.2 to implement monitoring for cultural resources and tied to research on sites for potential benefit of HFEs. The tool is Lidar and have worked with group out of Menlo Park. In an attempt to reduce costs is to purchase equipment and do ourselves and that includes hiring a new person to do the work. The $104,000 is to purchase equipment. We haven't come up with how to purchase. It doesn't hold us back in first year but limits ability to move forward in the second year.

Leslie: Is that monitoring eveyr year or after every HFE?
Helen: One of the things we agreed to do in the first year is to try to work with BOR and other stakeholders that we have agreement on how to monitor in the long run. Proposal was to monitor annually at a sample of sites and represent the groupings of sites. If you read the proposal, some sites would benefit better and give a better response so developing hypotheses. This amount of money is key component to do work in FY16-17.
Leslie: Is this ongoing direct and indirect costs captured in that?
Helen: The salary was deferred in the second year.
Shane: On page 158 it says 123,624 but on the table on 170, FY15 it its 292,….
Helen: Jack said to take out the cost of lidar for the first year.
Shane: So page 158, 123,624 that was recommended. Plus 174,000 gives total of $297,624 on page 270. That's not clear in this table that 174,000 is equipment.
Helen: I wasn't in support in how this was being presented.
Shane: $174,000 is for equipment for use in Fy16-17. Your budget in FY16 goes to ___ in. If this group doesn't fund in Fy15, what does that mean? The project goes to zero?
Helen: If it wasn't funded in Fy15, the focus would be on developing the monitoring plan and not doing field work but purchasing the equipment for it and then in FY16 we would be implementing the monitoring in FY16-17.
Shane: If you look at operating expenses, FY …. Most of that is operating expenses. In Fy16 you've got more equipment to buy. So what happens if this doesn't get funded in FY15?
Helen: Trying to find a way to purchase this equipment. Looking at special funding opportunities in USGS. If not funded, we won't have a monitoring program that is using measured change as far as monitoring. It would be a different monitoring.
Shane: Can you make it up in FY16?
Helen: The reality is that if we have a budget that is already $2million over. The inclination is to say it gets deferred but other things will also be deferred.
Shane: That adds a huge wrinkle if FY16 and 17 isn't balanced. Glen, have you thoughts for monitoring cultural resources and dam operations. Is this something BOR could fund?
Glen: Well, I'm at a loss since Mary's not on the call. We have picked up some funding for project 4. I think all of that whole equation has been run through the computer.

Helen: That's where we want to have these other conversations with the CRAHG and if all these things proposed need to happen.
Shane: Do you have support from the tribes?
Helen: I don't feel comfortable answering because not all the players have been present. A lot of the tribes will have concerns about other things to be funded.
Peter: It's not that we don't support the project, looking at all the cultural projects to be funded and prioritizing things. Having a CRAHG meeting would be a major topic for discussion.
Helen: thank you peter. Put in perspective, been working with group in Menlo Park and so many demands on their projects. Part of our concern is get someone who can stay focused on the project. Every 2 years we were giving them new lidar equipment … overhead. We could rent it out
Glen: It sounds like CRAHG needs to talk about this some more?
Helen: It's a bigger issue than just the CRAHG. Hopefully there's a larger interest in this program and how dam operations are affecting these resources.
Scott: Helen and Joel Sankey have been talking about using carryover funds to purchase this year and working wit hDave Lytle on any Center funds, we're halfway there. Think there's a good chance of getting part of this. We're watching this one pretty closely because there's a lot of interest in this.
Peter: Should be more than just the CRAHG concerns. This could have broader application.
Shane: Thought TWG got pretty support for this but with $174,000 in one year where there are other overages, and now we're being forced to look at new, novel programs and we should've said to cut the other programs. I feel like that if that's what we need, it should've been in the budget because it's been there for a long time and the TWG supported it.
Helen: I think Jack was looking for some further affirmation on this project.
Shane: Scott, it's going to be real helpful if you have money you can find, this is the biggest unfunded item in Fy15.
Scott: The reason I'm holding my cards, Jack hasn't seen some of the numbers and can't promise that he's not aware of.
Shane: Will you have numbers for the TWG meeting?
Scott: will bring preliminary numbers.

- **Project 5.1.6**

Scott: This was a decision I made to move this over and figure out where to have savings. This seemed like one that could wait because of other field work. That was my rationale to move into unfunded. It's important to do but given all the other things that Ted K and Jeff M put in Project 5, it's an ambitious move in the aquatic foodbase work.
Shane: This is a big jump for this program. Are scientists over-extended doing this work?
Scott: We did that on the fishery side in 13-14 and think we made a lot of progress. Ted and Jeff feel it's important to push forward and gain a better understanding of this aquatic foodbase in Glen Canyon and have a broader collaboration with folks on Green River.
Shane: Doing this …..?
Scott: I think the field work should come first. Again, to have a better sense of conditions out there and narrow down into a few focused areas. The analogy on how we approached the …. There was a solid foundation in the field. Catch data as well as early trout removal (?) and in direction to what David Ward is doing.
Dave G: We had some of same questions.
Shane: I don't have these projects memorized. Do I remember that there is field work looking at aefid and where the eggs are being laid. We're basically going to be in field to look for eggs and survival rate and then what we see we'll do some laboratory analysis.
Dave Rogowski: These projects don't seem to be developed enough, not clear how the work is going to be done.
Scott: All I can say is that they're brief descriptions and the two people who could answer are on the river. There are some challenges.
Dave R: it wasn't developed enough to determine if the project is worthy enough. I couldn't evaluate it without more information.
Shane: I suspect there's going to be a need for discussion on the foodbase program.

- **Project 5.1.7**

Clayton: Did you finish talking about project 5. I've talked to Jack about this and don't know if Jack sent that information along to Scott but WAPA is particularly interested in the issue of EPT and happy to have Ted Kennedy be the principal investigator … comparing studies. We've asked Jack if it was okay to have Ted and others submit their task descriptions to Rich Valdez, Scott Miller and Colin Baxter and Jack agreed to do that. We're mainly focused on how these studies help us understand why there is EPT below Flaming Gorge and fluctuates in percentages and there isn't EPT in Grand Canyon. One thought is that scientists think the project is focused on that and the field work is comprehensive at looking at that and we feel comfortable, WAPA will go to our annual meeting with scientists and look at proposed expenditure for next year in August and if we decide to include these studies, we'll budget them for next year and we'll fund the studies as recommended by this group of scientists. The question to whom the funds hasn't been decided. Typicailly we hire scientists by funding Argonne and they hire the people. That's the process.
Leslie: The TWG and BAHG need to understand that WAPA has its own budgeting process.
Clayton: We won't know anything until August and want them held as placeholders. It will be within our normal scientific budget that we set aside.
Leslie: If I have other questions, I'll get back to you.
Clayton: We're quite intrigued that we do some intra-basin comparison on this topic.

- **Project 6.5**

Shane: It's a msall amount of money, moderate
Bill Persons: Page 223, proposed by Dave Rogowski to try and find natal origins of Brown trout… We see young fish at Lees Ferry. Have a lot of questions on adult BT. David suggested we look at pigment patterns and perhaps identified their origins. …. Using BT and … as surrogate … micro chemistry. It's a moderate priority, and could possibly be deferred.
Shane: Micro-chemistry work …..
Bill P: If we can get a microchemistry …. It's expensive a…..
Shane: You would also take BT during other trips as well as we're covery with Park Service and …..
Scott: We're monitoring particularly near the complex of the LCR.
Bill P: we need to establish some microchemistry baseline and need to have some unmarked …other surrogate species. Project 6.2 is the HBC ….
Bill P" we'er going to get samples for NPS and NPS …. Starting to get a few infant mortailities. This isa pass through.
Dave R: Thie equipment is to buy … logistic for
Shane: If we'redoing microchemistry.
Scott: The closest is this issue --- no guarantee this will work. It was my decision to move it over under the Primary
Shane: There's always money that gets drops and if we could prioritize some of the unfunded projects and if money doesn't get spent on some projects, the money could be used here.
Scott: Yes, some work gets canceled so having a Plan B will be useful.
Shane: Davd, if you got the money partially in the year, could you still move forward?
Dave R: yes. The work can take place anytime, just developing the technique.

- **Project 9.4**

Scott: We had some discussion about this. In our early prospectus, this is one that without Mike's knowledge I cut in half and funded. The level of work to complete this it was possible.
Mike Yard – This is linked with the natal origin project. The overall objective is look at bundance, growth, and removal. Many of the projects were focused on growth and answer some of the overarching questions. We have varying abundances of RBT distributed in Glen and Grand Canyons. We're trying get at the some of the underlying mechanisms ….. retention of prey. Good is in the mix on whether fish are moving. Feeding morphology in ___. Our prey base is economically poor. There appears to be a strong relation on condition and size of fish relative to what they're eating. This comparative study would lead us to a better understanding of morphology on RBT and be the mechanism for movement.

Shane: This is potentially related to the genetics work?
Mike: There are a lot of linkages a…. with Ted K and why we lack some invertebrates …..
Shane: This is a tough one. It's a sizeable amount of money to look from someone else. Is there ways of getting at this for less.
Dave R: …. Change and response to food. As far as management …
Mike: no, what the current morphological structure … ties … drift sampling that went on with natal origins and projected to go on next two years. Utilization of fish.

- **Project 9.5**

Scott: 9.5 and 9.7 are somewhat related. Looking for cost savings, Mike and I had discussion. He had thought of a reduced level and move this forward. Maybe he can tackle that one and do a two for one.
Mike: Trying to understand how sediment help with condition … turbidity influences feeding.
___: temperatures of what we see outside. …
Shane: So you're talking about partial funding for 9.5 and 9.7 and Scott you might be able to fund cheaper?
Scott: Mike thought ….
Shane. So half of 9.7 is not funded, so what do you do?
Scott: Think we should move forward with half funding. Is it the same for 9.5?
Mike: Yes.

- **Project 10**

Shane: Heard that $54,094 was needed to validate the process.
Ted M: the $95,000 is recommended for funding is salary for 3 already working and devote that time … the $54 would cover a study, publication and travel. FY15 side
Shane: We'll discuss more at the TWG meeting. If you don't get the 54K, does that hamper you getting off the ground?
Ted: That's correct.
Glen: Confusing if there is any proposal if the money doesn't get the additional funding?
Scott: We discussed this and Jack felt pretty strong about this. This was our effort to get a proposed budget under existing funding.
Glen: We can get into this next week.

- **Project 12.1**

Shane: This is Helen's workshop
Helen: This funding would be in support of that and the collaborative activities the tribes would have in the material development for future monitoring. It's going to be helpful to have a CRAHG meeting. We had good support from 3 tribes. Kurt said there wasn't for true tribal collaboration in this effort. This is limited flexibility in this budget. A big chunk of funding is my salary.
Shane: There was workshop ….
Helen: …. Developing a list of species to develop our analyses.

Call ended: 5:03 p.m.

Attachments:
Attachment 1: Comments from: John Spence (GLNRA), Bill Stewart (AGFD); Ranking form from Chris Hughes, John Jordan and John Hamill

Comments from John Spence, Glen Canyon NRA on TWP
9 June 2014

I have focused my review on the vegetation and wildlife sections under Project No. 11, based on my educational background and field experience. In general, I think the sections I have reviewed would benefit from objective reviews by outside plant community ecologists and ecological statisticians, including appropriate academic researchers. I am reviewing this under the assumption that this is either happening or will be happening prior to finalizing the long-term plan. Thus my review is general in nature and raises general issues about sampling design, scale, and other monitoring-related concerns.

Project 11.

The Introduction talks about using 20 pre-selected sand bar complexes as the basis for the proposed vegetation work. However, later in PE 11.1 other settings (channel margins, randomly placed sites) are mentioned. This is a little confusing. It would be useful to have a table indicating which work will be done at which types of sites to help organize the section.

Most of my review comments are on the ground-based vegetation sampling and avian projects.

<u>Project Element 11.1</u>

P. 106: Sand bars represent only a small portion of the river system and are not necessarily representative of much of the river corridor. Especially in the lower canyon much of the riparian vegetation and associated avifauna is not connected to sand bars. To the extent that work is focused on sand bars, inferences will not be possible for much of the system. There is some confusion for the reader as other geomorphic settings are also mentioned in the vegetation project, so it would help to better articulate the sampling framework and project elements vis-à-vis specific geomorphological settings.

P 107: The response guild approach is interesting, but the concept is still somewhat theoretical and may be difficult to apply at the scale of the river corridor and with the mix of riparian species present. Although draft "guilds" can likely be developed, there is always the potential problem that species respond individualistically to various environmental predictors. Further, the same species may be classified in different types of guilds depending on whether one is looking at limiting factors, disturbances, resources, etc. I would like to see a much better articulation of how the theory is going to be used with ground-based vegetation data – in the TWP it is all pretty vague. This especially becomes a problem when polygons may have mixes of species with differing guild adaptations (see below).

P. 109 (at the end of the section on fixed site sampling and also random sampling): The most serious concern I have is how the ground-based vegetation sampling will be done. The two chosen measures seem to be canopy cover and species presence. There are several issues that need to be better resolved in the TWP in order to answer concerns about repeatability, accuracy, precision, scale and appropriate performance measures. These are reviewed below.

1. Repeatability, accuracy and precision: canopy cover and richness can be measured in a variety of ways, but most are extremely subjective and sensitive to observer errors. Canopy cover visual estimation in particular is extremely difficult to collect in an objective manner, and is not very repeatable. There are many ways around this, such as using point counts along transects, frames with pins, intercept sampling, etc. yet there is no mention of how canopy cover data is going to be collected, and how this problem is going to be resolved. Without understanding the quality of the data collected it begs the question as to whether the data can be used to make informed management decisions.

2. Scale: Scale issues are critical to both sampling and to species diversity (including presence/absence). The use of 1-meter quadrats is fraught with problems of scale. Originally, in the European schools of vegetation ecology

this size was recommended primarily for low-growing herbaceous vegetation, not for riparian shrubs. Species richness in particular is strongly affected by sampling pattern and size (quadrats, plots, shape of plot, etc.). In general, the larger the plant species, the larger the plot size required for sampling. For tall shrubs a typical size would be 25-100 m^2. The modified Whittaker plot approach is one available method, but is somewhat time intensive. Simpler circular or rectangular plots scaled for different growth forms would be appropriate. Use of a 1-meter quadrat for anything larger than low shrubs should not be done when sampling vegetation. Part of the issue with scale relates also to the pattern in the vegetation, i.e., how individuals are spaced with respect to each other. An excellent discussion of the issues around these concepts and various tests and solutions can be found in Grieg-Smith (1983: Quantitative Plant Ecology, 3rd Ed.). A clear analysis and articulation of the sampling methodology, the pros and cons of the selected methods, repeatability, precision, accuracy and scale are critical to development of any long-term vegetation monitoring program.

3. Performance measure: the most commonly used measure of taller (>2 m) woody species performance is not canopy cover, rather it is stem density and DBH, usually in plots that are appropriately scaled to the stature of the species (larger trees = bigger plots), as well as the individual plant spacing. Canopy cover cannot be accurately measured using subjective ocular estimation. Other methods are preferable based on logistical constraints. These include use of a light meter or other device to capture leaf interception (e.g., spherical densitometer; the idea being calculation of some type of eaf area against the sky background), the Total Vegetation Volume (TVV) method, or sampling stem density and size in belt transects or other plots.

P. 110: Table 2 – what does PI stand for?

P. 111: Collection of species richness, and in general presence/absence is affected by scale and phenological considerations. Using small quadrats (randomly or fixed) will miss many species. Some analysis of scale dependency and sampling intensity should be included based on already collected pilot data that can be used to determine when sites are adequately sampled. PC-ORD has a method that uses jackknife estimation that is easy to implement.

P. 113-114: for response guilds, the following comments are relevant to all project elements.

1. Presumably polygons are composed of several species, sometimes in mixture and sometimes as mostly single dominants. In the former I think it might be difficult to assign a single guild designation if several species are present and common. For example, *Salix exigua* is not likely to be in the same response guild as tamarisk on many settings, yet they often co-occur. *Phragmites* and *Typha* are very different in their adaptations to hydrologic variables, but also often co-occur.

2. Given that we are looking at complex variations (gradients) in several hydrologic responses across different scales (individual, population, etc. – see Merritt et al. Table 1), it becomes extremely important that the appropriate variables (water potential, leaf size, root architecture, etc.) are selected as well as the response variables, whether flooding disturbance, sediment grain size, resource limitations, etc. It is highly likely that a single species may respond very differently depending on what variable is being studied. I think that this aspect of the TWP needs to be carefully analyzed with working hypotheses and conceptual models of predicted responses to be developed, reviewed and refined. Currently, nothing is explained in the TWP on how this approach is going to be used to benefit long-term monitoring and understanding of riparian vegetation and wildlife habitat. However, I think that making the attempt is worthwhile as it could provide a valuable test of the approach in a large-scale complex system.

<u>Project Element 11.2</u>

This element looks appropriate, methodology and objectives seem reasonable.

P. 113: for some riparian vegetation I think that a one species-one image pixel (polygon) will not work very well. This needs to be tested with pilot data. There are ways to get around potential problems using some combination of species correlation analysis, such as pair-wise approaches, to develop species combinations (or perhaps more species) that co-occur. However, this issue may be less of a problem with respect to response guilds, as these tend to integrate several species in a pixel showing presumably similar adaptations. However, with multi-canopy vegetation there will still be some cross-walk issues to solve.

Project Element 11.3

Some of the same issues found in sampling in 11.1 are relevant in this project. Also, the methodology seems to make the assumption that response guilds for riparian woody vegetation will be used as they form the basis of the sampling approach. But what if they don't work?

Project Element 11.4

In general, bird species respond to a variety of factors including those on wintering grounds, migratory corridors and breeding grounds. Thus changes in riparian habitat for breeding riparian species is only one aspect of a larger complex story of change. Previous power analysis has shown that most species cannot be monitored in this system without significant expenditures and timeframes.

Short of intensive sampling, there seem to be several ways these issues could be resolved. These include presence/absence (occupancy theory), guild approaches, or using selected *common* permanent residents that are restricted to riparian vegetation. Occupancy theory is a promising new way to look at changes in bird distributions, and is generally easier to do than sampling using intensive point count and distance estimation methods. However, this approach would best be done using a relatively large subset of the river corridor, and sample sizes approaching 40-50 or more. To use the Glen Canyon reach, as suggested in the methods, is simply too limited for this approach, as there are at best 10-15 independent locations that could be used.

Another issue is what exactly do bird species respond to in their habitat? This will likely vary, from responses based on available nest cavities (ash-throated flycatcher) to canopy volume and cover/density (many insectivores), to particular food items (phainopeplas). However, bird populations are usually not controlled by canopy cover per se, rather vegetation structure, volume and in some cases particular plant species are important. In the 1996-2000 program Total Vegetation Volume was used as a measure of habitat structure/complexity. Something like this will need to be repeated if contrasts with those data sets are going to be made.

I would encourage the use of occupancy methods for looking at changes in distribution for riparian bird and other selected animals species, focusing on those restricted to the riparian zones.

Comments from Bill Stewart, AZGFD

Project 5.1. This is a very expense and comprehensive food base project (FY15 = $421,452, FY16 = $449,969, FY17 = $517,973) Can GCMRC please provide a prioritized list of the project elements? I would like to know what would be lost if each element is not funded. I feel that there are many questions surrounding the impact of flows on food base, but not all need to be answered during the work plan.

5.1.1 (Insect emergence in Grand Canyon via citizen science; Recommended for funding $117,920)
Is the data collected via citizen science robust enough to evaluate changes in species diversity and density over time? In other words, if there was a core monitoring program for foodbase, would this be it? What is lost if we discontinue this work or reduced frequency of collection?

5.1.2 (Quantifying the effects of hydropeaking on oviposition and egg mortality; Recommended for funding $97,236)
It's difficult to assess the feasibility of this project element if details are lacking. How is this study going to be carried out? Is this river wide? Can funding be reduced if focus is at Lees Ferry where hydropeaking will likely have the greatest effect?

5.1.3 and 5.1.4 (Synthesis projects; Recommended for funding $29,672 and $29,672)
With restricted budgets I am concerned about the extent and cost of this project. I am not convinced that conducting a synthesis stressors and controls on EPT distributions and synthesis of foodbase in western tail waters takes 3 years and $200,160 to complete. I would suggest reducing costs and time frame (ex $75,000-$100,000 for 2-years) and putting this out for competitive bid.

5.1.5 (Natural history of oviposition for species present in Grand Canyon; Recommended for funding $25,878)
It's difficult to assess the feasibility of this project element if details are lacking. This project element is not clear to me. Please explain what actually will be taking place under this element.

5.1.8 (Natural history of oviposition for EPT via studies in the Upper Basin; Submitted for non-AMP funding $25,878)
It's difficult to assess the feasibility of this project element if details are lacking. This project element is not clear to me. Please explain what actually will be taking place under this element. If this does not get funded will that impact project 5.1.5?

5.2.2 (Continue Natal Origins drift monitoring in Glen, Marble, and Grand Canyons; Recommended for funding $87,365)

Is the information we gather from this work in terms of changes in species diversity and density over time different from that of project 5.1.1 (citizen science)? What is lost if we discontinue this work or reduced frequency collection (ex. discontinue January NO trip)?

5.2.3 (Link drift at Natal Orgigins project transects to channel bd shear stress; Recommended for funding $20,619)
Why is this funding through FY17. The project states that this work can be done over the course of one NO trip.

6.2 (Humpback chub aggregation recruitment studies; Recommended for funding; $83,750)
I support this project as determining the natal origins of humpback chub is important in understanding the areas we need to focus monitoring and management efforts. A similar project was budgeted for in the FY13/14 work plan ($85,000) and as I understand it was not completed due to tribal concerns of the taking of life of humpback chub.

1. If the project proposed in FY13/14 was not completed, what happened to the $85,000 from FY13/14 and why is another ~$84k in FY15, ~$54k in FY 16, and ~$50k in FY17 being spent on this project?

2. This question might be more appropriate for the tribe(s) that were concerned, but will the taking of life of the surrogate species be a problem?

6.4 (System Wide Electrofishing; Recommended for funding; $283,722)
I appreciate GCMRC for incorporating the comments we provided on an earlier draft of this project. The system wide electrofishing program has been the cornerstone of long term monitoring of native and non native fish species in the Colorado River through Marble and Grand Canyons. Species interaction, habitat availability, food availability, and water quality dictate the presence and distribution of fish species throughout the CRE. The standardized collection of relative fish abundance and distribution collected from the long term monitoring is important as it is very difficult to conduct biological experiments in a largely uncontrolled environment. While we agree that a reduced effort and duplication of effort is warranted we have not been convinced that a focus on abundance measures instead of CPUE is warranted nor has it been shown that this is feasible, or an acceptable alternative to the long term monitoring currently occurring. While we agree that abundance estimates at certain locations of high interest (e.g. at the confluence of Bright Angel Creel and the Little Colorado River) should be pursued the standard monitoring program should not be abandoned for short term goals, that may or may not be achievable. Changes to this program must be done with caution.

6.5 (Brown trout natal origins through body pigmentation patterns in the Colorado River; Unfunded, moderate priority $16,146)
Not sure I would consider this a moderate priority project in the context of other projects that are listed as funded. Identifying the source of brown trout and other high risk nonnatives has been identified as an information need in the NPS comprehensive fish management plan.

6.6 (Mainstem translocations of humpback chub; Recommended for funding $9,790)
This project might be more appropriate in under project 8. Also is there adequate funding for this project (FY15 = $9,790)? This is much less for what appears to be similar work in project 8.2 (FY=15 $88,600)

6.7 (Rainbow Trout Early Life Stage Survey; Recommended for funding $77,024)
This might be more appropriate under project 9.

2009 PEP recommended:

> Monitoring age-0 trout habitat use and movement is not routinely needed because the electrofishing survey provides a direct index of pre-recruit trout density. Similarly, redd counts are not needed because the electrofishing survey provides a direct index of adult trout density. This program's strength is in evaluating the impacts of flow manipulations on early life history, and it should be part of the evaluation of future flow tests.

The need to conduct annual RTELLS work should be considered when evaluating a standardized monitoring program for Lees Ferry as proposed in project 9.1.

7.3 (July Little Colorado River juvenile humpback chub marking to estimate production and outmigration; Recommended for funding $112,172)
What will be lost if this work is not conducted? I have a concern about costs ($112,000), additional helicopter flights, handling of chub in summer for this project. I am not sure if the benefits of this project outweigh the costs. There will always be some level of uncertainty around the actual population of HBC. I think at some point we just need to accept it and focus more on the population over the long term. Is it going up or is it going down. At some point ASMR became unacceptable yet we were able to make decisions based on the population estimates that came from that model. This project is planned for an additional three years why is that necessary?

7.6 (Potential for gravel substrate limitation for humpback chub reproduction in the LCR; Recommended for funding $11,600)
I have a hard time understanding how this will apply to management decisions. With budget restraints I do not see this as a high priority project and do not recommend this project element for additional funding at this time. I would suggest seeking outside funding or propose this during the next workplan.

7.7(Evaluate CO2 as a limiting factor early life history stages of humpback chub in the LCR; Recommended for funding $86,420)
I have a hard time understanding how this will apply to management decisions. This project is expensive (FY15 = $86,420, FY16 = $98,210, FY17 $118,272). With budget restraints I do not see this as a high priority project and do not recommend funding for this project element. I would suggest seeking outside funding or propose this during the next work plan.

7.9 (Development of a Non-Lethal tool to assess the physiological condition of humpback chub in the Colorado and Little Colorado Rivers; Recommended for funding $41,876)
I have a hard time understanding how this will apply to management decisions. This project is expensive (FY15 = $41,876, FY16 = $95,526 FY17 $103,808). With budget restraints I do not see this as a high priority project and do not recommend this project element for additional funding at this time. I would suggest seeking outside funding or propose this during the next work plan.

8.1 (Efficacy and Ecological Impact of Brown Trout Removal at Bright Angel Creek; Recommended for funding $96,396)
As I understand it, this project was cut in half due to the HFE this past fall. If another HFE is planned in the fall can we expect a similar impact? I suggest using funding from project 9.9 (FY15 = $72,616), which is designed as contingency during HFE years, to fund this project during non HFE years? In other words in HFE years spend money on project 9.9 and in non HFE years spend money on project 8.1 and not try to do both at the same time especially if the HFE is going to affect data collection for project 8.1.

8.3 (Glen Canyon Dam Adaptive Management Program Fisheries Research, Monitoring, and Management Actions Protocol Evaluation Panel; Recommended for funding $0)
I fully support funding a Fish PEP to evaluate the fish program. I would suggest this occurs in FY16 and not FY17 so there is time to work PEP recommendations into the FY18-20 work plan.

Project 9.1 (Rainbow Trout Population Dynamics – ongoing modeling and future monitoring; Recommended for funding $37,120)
Maybe I am missing something here, but this is a dramatic shift from the long term monitoring program that has been in place since 1991. This long term monitoring project has done a good job of monitoring trends and as one of the primary stakeholders for this fishery do not feel like we are missing population changes to the fishery. The NPS comprehensive fish management plan outlines stocking triggers based on this long term monitoring, which will no longer be valid under the proposed changes. There are certainly tradeoffs with doing mark/recapture vs CPUE and those tradeoffs should be evaluated by the stakeholders.

1. Is this replacing the standardized trout monitoring at Lees Ferry? If so I do not agree with this project as proposed. Lees Ferry standard monitoring should be funded. Funding for this project in FY13/14 was $217,000/yr.

2. Similar to what is proposed in project 6.4, AZGFD in coordination with GCMRC, would like an evaluation of the standardized sampling at Lees Ferry with what is proposed in project 9.1. However, before this is done we should not change the standard sampling at Lees Ferry as proposed.

9.2 (Detection of Rainbow Trout Movement from the upper Reaches of the Colorado River below Glen Canyon Dam/Natal Origins; Recommended for funding $440,512)

1. What information is lost if we eliminate the January NO trip?
2. How much money will be saved if we eliminate the January NO trip?

9.3, 9.4 and 9.5 (Multiple projects)
9.3 is recommended for funding, 9.4 is unfunded and 9.5 if partially funded. I have a difficult time seeing the ties to management of each of these projects and do not feel that these projects are high priority. What information is lost if we do not conduct each of these projects?

9.7 (Application of bioenergetics model in a seasonally turbid river; Recommended funding $33,234, Unfunded High Priority $33,234)
Maybe I missed something here, but I do not recall seeing result from FY13/14 work plan. Half of the funding for this project is recommended. Can this project be completed if only half funded?

9.9 (Effects of High Experimental Flows on Rainbow Trout Population Dynamics; Recommended for funding $72,616)
See comment for project 8.1

Project 10.
Will this project provide a comprehensive fish habitat assessment? I would like to see system wide assessment of physical habitat suitability for fish species of interest in the CRE and not just rainbow trout. For example I would like to know where and how many miles of suitable (physical) habitat exist for adult Humpback Chub. I like and support the concept of this project and would like to see it fully funded.

Project 13.1 (Economic Values of Recreational Resources along the Coloraod River-Grand Canyon Wiewater Floater and Glen Canyon Angler Values; Recommended for funding $69,801)
We suggest collaborating on the interviews and experimental design to make use of AGFD expertise in angler surveys at Lees Ferry.

FY15 Recommended for Funding				FY15 Unfunded/Recommend			
GCDAMP	**Other BoR Sources**	**Internal USGS/ SBSC funding**	**Total**	**High Priority**	**Moderate Priority**	**Notes**	**Hughes**
$48,624	$75,000		$123,624		$174,000		2
			$0	$37,038			
			$0	$58,762		Submitted to Western Area Power Administration for funding consideration	
			$0	$25,372		Submitted to Western Area Power Administration for funding consideration	
			$0	$142,641		Submitted to Western Area Power Administration for funding consideration	
			$0		$16,146		
			$0		$86,420		
$20,000			$20,000	$18,512			
$33,234			$33,234	$33,234			
$95,000			$95,000		$54,094		1
$45,000			$45,000		$7,161		
$241,858	$75,000	$0	$316,858	$315,559	$337,821		

			FY15	FY15 Recommended for Funding				FY15 Unfunded/ Recommended			
(M)Monitoring (R)Research	Project Identifier	Project Description	Total	GCDAMP	Other BoR Sources	Internal USGS/ SBSC funding	Total	High Priority	Moderate Priority	Notes	Jordan
M	4.2	Monitoring of cultural sites in Grand and Glen Canyons	$297,624	$48,624	$75,000		$123,624		$174,000		8
R	5.1.6	Laboratory studies on insect oviposition and egg mortality associated with changing water levels	$37,038				$0	$37,038			2
R	*5.1.7*	*Comparative emergence studies in Upper Basin using citizen science light trapping*	$58,762				$0	$58,762		Submitted to WAPA for funding consideration	9
R	*5.1.8*	*Natural history of oviposition for EPT via studies in the Upper Basin*	$25,372				$0	$25,372		Submitted to WAPA for funding consideration	10
R	*5.2.5*	*Comparative longitudinal drift studies in Upper and Lower Colorado River Basin tailwaters*	$142,641				$0	$142,641		Submitted to WAPA for funding consideration	11
R	6.5	Brown trout natal origins through body pigmentation patterns in the Colorado River	$16,146				$0		$16,146		4
R	9.4	Comparative study on the feeding morphology of drift feeding fish	$86,420				$0		$86,420		5
R	9.5	Meta-analysis and the development of reactive distance relationships for encounter rate models	$38,512	$20,000			$20,000	$18,512			6
R	9.7	Application of a bioenergetics model in a seasonally turbid river	$66,468	$33,234			$33,234	$33,234			3
R	10	Mapping and Assessment of Aquatic Habitats below Glen Canyon Dam	$149,094	$95,000			$95,000		$54,094		1
R	12.1	Tribal workshop and analysis of cultural landscape change	$52,161	$45,000			$45,000		$7,161		7
		Total	$970,238	$241,858	$75,000	$0	$316,858	$315,559	$337,821		

As you all know I consider Food Base to be the most critical problem in the Cre. It is not just a trout related item. It is impared and we truly do not yet understand it.

Note A: since these are proposed to be fnded by WAPA I don't see them as an issue in prioritizing unless WAPA is going to make the fund available to any other programs.

Priority !: Modifying dam flows is not an easy change. This work would provide indication to the effect of various flow on the egg mortailty It should be noted the PI placed this project as a moderate priority

9.4 Priority : This project could explain a part of the answer to why fish don't grow larger here. If the food base is too small for the gill rakes to capture (as may be the case with the midges and black flys) this could give an indicattion as to which taxa of EFT to focus on. The PI gave this a lower priority.

9.5: I would need to understand more about the role on this project in the scale of all project to move it higher

9.7 Concur with AZGF project is alread in progress

10.0 This is a good prject which may go much further than we had anricipated. The funding priority was established by the GCMRC management, which is project supportive. I would let the

			FY15	FY15 Recommended for Funding				FY15 Unfunded/ Recommended			
(M)Monitoring (R)Research	Project Identifier	Project Description	Total	GCDAMP	Other BoR Sources	Internal USGS/ SBSC funding	Total	High Priority	Moderate Priority	Notes	Hamill
M	4.2	Monitoring of cultural sites in Grand and Glen Canyons	$297,624	$48,624	$75,000		$123,624		$174,000		7
R	5.1.6	Laboratory studies on insect oviposition and egg mortality associated with changing water levels	$37,038				$0	$37,038			2
R	*5.1.7*	*Comparative emergence studies in Upper Basin using citizen science light trapping*	$58,762				$0	$58,762		Submitted to WAPA for funding consideration	8
R	*5.1.8*	*Natural history of oviposition for EPT via studies in the Upper Basin*	$25,372				$0	$25,372		Submitted to WAPA for funding consideration	9
R	*5.2.5*	*Comparative longitudinal drift studies in Upper and Lower Colorado River Basin tailwaters*	$142,641				$0	$142,641		Submitted to WAPA for funding consideration	10
R	6.5	Brown trout natal origins through body pigmentation patterns in the Colorado River	$16,146				$0		$16,146		3
R	9.4	Comparative study on the feeding morphology of drift feeding fish	$86,420				$0		$86,420		5
R	9.5	Meta-analysis and the development of reactive distance relationships for encounter rate models	$38,512	$20,000			$20,000	$18,512			??
R	9.7	Application of a bioenergetics model in a seasonally turbid river	$66,468	$33,234			$33,234	$33,234			4
R	10	Mapping and Assessment of Aquatic Habitats below Glen Canyon Dam	$149,094	$95,000			$95,000		$54,094		1
R	12.1	Tribal workshop and analysis of cultural landscape change	$52,161	$45,000			$45,000		$7,161		6
		Total	$970,238	$241,858	$75,000	$0	$316,858	$315,559	$337,821		