United States Department of the Interior
U.S. GEOLOGICAL SURVEY
GRAND CANYON MONITORING AND RESEARCH CENTER
2255 NORTH GEMINI DRIVE, MS-5000
FLAGSTAFF, ARIZONA 86001
928 556-7094 Telephone
928 556-7092 Fax

November 6, 2006

MEMORANDUM

To: Technical Work Group

From: Chief, GCMRC

Subject: Comment response re: September 13, 2006 Draft Monitoring and Research Plan (MRP) to Support the GCDAMP FY 2007-11

The September 13, 2006, version of the MRP is the third draft of the MRP. It has been reviewed by the Science Planning Group (SPG) and presented to the TWG on two occasions. This version was modified based on comments that were provided by the SPG in early July and written and oral comments provided by several reviewers including the Science Advisors. Major changes reflected in this version include:

1. The Core Monitoring section was expanded to more clearly articulate the process for evaluating projects for core monitoring status.

2. Table 2.1 was revised to show the linkage between GCDAMP goals, AMWG priority questions, priority strategic science questions and information needs, and planned science activities.

3. The list of strategic science questions and information needs was pared down to highlight the highest priority questions and needs.

4. Goal 11 (Cultural Resources) was revised to address comments provided by the CRAHG.

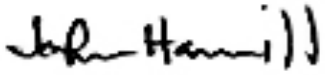
5. The document was reformatted and edited to improve its readability, ensure consistency between major sections of the MRP, and provide a link to all the projects included in the FY07 Annual Work Plan.

Comments on the September 13, 2006, version of the MRP were provided by the Grand Canyon River Guides (GCRG), Glen Canyon National Recreation Area (GLCA), and Bureau of Reclamation (BR). Only the GCRG provided comments by the comment deadline (October 18) that was established by the TWG Chair. We responded to all the comments provided by GCRG and BR (attached). Only the major comments provided by GLCA are addressed (attached).

Comments provided by GLCA reflect a major disagreement with the MRP including the

proposed science planning process, the reliance on AMWG priority questions and related strategic science questions as the primary guidance for the MRP, and the core monitoring evaluation process. To fully respond to the issues raised by GLCA would require a major departure from the SSP and the approach that has been presented in the two previous drafts of the MRP. It is beyond the scope of GCMRC to respond to all of the comments before the TWG meeting. In my view, several additional AMP meetings and several months of GCMRC staff time would be needed to resolve all the issues and question raised by GLCA, including a revision of AMWG priorities.

We look forward to discussing these comments and our responses at the TWG meeting on Nov 8-9, 2006.



JOHN HAMILL

Attachments:
Grand Canyon River Guides Letter, Sept 19, 2006
GCDAMP Monitoring and Research Plan Comments, Oct 20, 2006
National Park Service, Glen Canyon National Recreation Area Comments, undated

cc Dave Garrett
Andre Potochnik
Lynn Hamilton

September 19, 2006

Mr. John Hamill
Grand Canyon Monitoring & Research Center
2255 North Gemini Dr.
Flagstaff, AZ 86001

Dear John,

Grand Canyon River Guides commends the Grand Canyon Monitoring and Research Center on the comprehensive and thorough **Draft Monitoring and Research Plan to support the Glen Canyon Dam Adaptive Management Program, FY 2007 – 2011.** As the recreational stakeholder for the GCDAMP, we offer the following observations and recommendations for your consideration prior to the finalization of this plan:

Biennial timetable for sediment monitoring
No rationale is presented for the change from annual to biennial measurements of sand storage changes. Several factors lead us to a firm belief in the necessity of retaining an annual sediment monitoring program (at a minimum):

- Sediment is crucial to the health of multiple resources in Grand Canyon: recreation, fragile cultural resources, aquatic and terrestrial ecosystems including near-shore habitat and backwater ponds.
- The conclusions drawn from the EIS team, which are not supported by recent data, "resulted from a lack of continuous data in the post-dam era." (SCORE report).
- Sediment monitoring requires consistency and cohesiveness between a variety of efforts (campsite monitoring, sandbar volume studies, and an assessment of increasingly problematic vegetation encroachment).
- "Conservation of Grand Canyon's fine-sediment resources is a primary environmental goal of the Glen Canyon Dam Adaptive Management Program." (SCORE report).
- Ongoing, annual sediment monitoring is integral to the understanding of AMWG priority #4, approved in August 2004: "What is the impact of sediment loss and what should we do about it?"
- The recently convened (August 2006) Sediment Protocol Evaluation Panel has not delivered its recommendations for future monitoring of the sediment resources. Why change monitoring protocols before receiving a recommendation from the panel?

Grand Canyon River Guides therefore strongly recommends restoring sediment monitoring and

all associated programs to an annual basis.

GCMRC Response: *We agree with the main points included in the above comments. The long history of science support in the program reflects the fact that sediment resource objectives are critical to the program. We also recognize that the Core Monitoring Information Needs related to sand storage in Goal #8 of the AMP Strategic Plan identify a need for "annual or biennial" data on fine-sediment resources. We also believe that additional sand storage measurements must be made before and after future high-flow, sediment tests (experimental data) or beach/habitat building flows (when implemented as management actions). The Draft Monitoring and Research Plan assumes that monitoring data collected on a biennial timescale will continue to be augmented by additional measurements made when sediment testing or management floods occur. Combined, such activities are estimated to provide the essential information needed by both scientists and managers to identify long-term sediment trends associated with sand bar resources. Additional measurements might also be identified as a need associated with integrated field research focused on linkages between sand bars and habitats related native fishes, recreational camping, and terrestrial ecosystem issues.*

Beach/Habitat Building Flow plans

The Draft plan indicates that two additional BHBF tests be conducted during the FY07 – FY11 period, provided the sediment triggers are reached. Grand Canyon River Guides contends that such rigidity could be to the detriment of the downstream resources that the Glen Canyon Dam Adaptive Management Program is charged to protect, for the following reasons:

- New information related to BHBFs as described in your September 1, 2006 memorandum to the Adaptive Management Work Group included a unanimous recommendation from the nine member Sediment Protocol Evaluation Panel that managers consider implementing another test of the "sand enriched" high-flow *at the next available opportunity* as an attempt to resolve the sand conservation issue. (Emphasis ours).
- A recent assessment of tributary sand inputs indicates a likelihood of reaching the sediment trigger this year, yet TWG and AMWG votes to date preclude a BHBF in FY 07. Declining to act in a year when conditions appear to be optimal and sufficient experimental funds are available does not inspire confidence that the program will be able to "restore and maintain sandbar habitat over decadal time scales" -- the primary strategic science question for sediment resources as outlined in your September 1, 2006 memorandum.
- ROD operations will continue to erode sediment deposits and prevent multi-year accumulation in the main channel.
- Sediment experiments such as Beach Habitat Building Flows are integral to the protection of the natural geomorphic features of Grand Canyon as guaranteed by the National Park Service Organic Act of 1916.
- Monitoring results (Kaplinski and others, 2005; Kaplinski and others, in prep) show that total campsite area decreased by an average of 15% each year between 1998 and 2003. This monitoring also shows a system-wide increase in campsite area following the November 2004 BHBF – clearly demonstrating the benefits of BHBF's to the recreational resources. Furthermore, during the post-dam era, ALL of the monitoring conducted from 1973 to 2005 (10 separate studies) show a similar pattern in the number

and size of campsite in Grand Canyon; significant increase after a BHBF, significant decrease without

- Currently no other mechanism exists for bringing sufficient sediment into the Colorado River system below Glen Canyon Dam.

Grand Canyon River Guides therefore recommends retaining BHBFs as a possible management action *for each given year*, should the sediment trigger be met so as to not waste these valuable opportunities that benefit the resource while building on knowledge previously gained. This in turn, allows the Glen Canyon Dam Adaptive Management Program to be fully adaptive and responsive to evolving conditions in Grand Canyon.

GCMRC Response: *The GCMRC acknowledges the importance attributed to sediment resources in the program identified in the above comments. During the 2005 Knowledge Assessment Workshop, sediment scientists identified that at least one additional test of the beach/habitat building flow concept under sand enriched conditions was needed to address whether or not existing sand supplies below the dam were sufficient to restore and maintain downstream sand habitats. It is unclear to us what level of sand bar restoration is needed under yet-to-be-defined future desired conditions. Hence, addressing the strategic science question for sediment will be subject to such conditions being identified by managers. It is unclear whether additional sediment restoration tests will be required following evaluation of the next experiment, but the Draft Monitoring and Research Plan attempts to identify a possible number of experiments that might be supported by projected annual science budgets tied to the experimental account. We are unable to respond to the final comment that* "Grand Canyon River Guides therefore recommends retaining BHBFs as a possible management action *for each given year*, should the sediment trigger be met so as to not waste these valuable opportunities that benefit the resource while building on knowledge previously gained. This in turn, allows the Glen Canyon Dam Adaptive Management Program to be fully adaptive and responsive to evolving conditions in Grand Canyon*." We do not support this proposal until sufficient data are collected from future testing that shows that there is a viable, flow-based option for sustainable sand bar restoration using the existing, limited sand supply below the dam. Recommendations about what actions are undertaken for management purposes resides with the management agencies.*

Sediment Dynamics

The brief section on sediment dynamics on Page 7 fails to discuss sediment supplies as being additionally crucial to the recreation resource. The Grand Canyon Protection Act charges this program to,

"…mitigate adverse impacts to, and improve values for which Grand Canyon National Park and Glen Canyon National Recreation Area were established, including, but not limited to natural and cultural resources and ***visitor use****."(Emphasis ours)*

Any full understanding of sediment dynamics must therefore take the recreational resource into consideration as part of an integrated scientific research effort.

GCMRC Response: *The basis for this comment is unclear. The section in question (Sediment Dynamics) specifically mentions camping beaches as one of the priority AMP resources that is*

dependent on having adequate sediment supplies and that will potentially benefit from the strategic implementation of experimental BHBFs in the future. We fully agree that campsites and other components of the recreation resource are important to consider when developing future experimental activities related to sediment and sand bars, and we will continue to keep the importance of the recreation resource in mind as we move forward with implementation of the MRP.

Scope of the GIS/Atlas Program

The SCORE report considered campsite inventory to be one of the largest gaps in current knowledge. We therefore commend the MRP for the inclusion of a comprehensive campsite inventory and GIS Atlas program to 1) develop a baseline inventory as a basis for determining system-wide changes and 2) assist in the evaluation of recreation impacts. In our view, the GIS/Atlas project should serve as a comprehensive "umbrella program" where the *integration of other reports, data, and photographic records could contribute to the greater understanding of the recreational resource as a whole*. Towards this end, our discussions with the Program Manager at GCMRC have validated the necessity of incorporating valuable datasets such as Grand Canyon River Guides' Adopt-a-Beach Program into this monitoring program in order to maximize efficiency through information sharing.

The Recreation Protocol Evaluation Panel noted that recreation monitoring heretofore is,

"…not performed at regular intervals, does not always occur concurrently with flow experiments, and does not provide comprehensive coverage of key recreational resources."

Yet, Adopt-a-Beach has been consistently monitoring over 40 beaches in three critical reaches since 1996, generating over 1,500 photographs plus an annual "State of the Beaches" report. A preliminary photo gallery incorporating the photographic record from the period 1996 – 2003 (approximately 1,200 images) has been developed and can be refined to maximize usefulness to researchers studying both campable area and vegetation encroachment. GCRG therefore recommends the inclusion of the Adopt-a-Beach campsite monitoring/photo-matching program within the scope and boundaries of this GIS Atlas program in order to provide the most comprehensive view possible of beach changes over time.

Grand Canyon River Guides greatly values our continuing participation in the Adaptive Management Program governing operations of Glen Canyon Dam as we strive to satisfy the intent of the Grand Canyon Protection Act. We are hopeful that the recommendations outlined above will serve to build in the consistency, flexibility and efficiency necessary for the success of this five-year Monitoring and Research Plan. If you should have any questions, please feel free to contact us.

GCMRC Response: *We agree that the Campsite Atlas and Inventory Project will provide an appropriate umbrella mechanism for integrating existing and future Adopt-A-Beach data with other campsite monitoring data. In the past, there was no way to effectively integrate the Adopt-A-Beach campsite imagery with other GCMRC monitoring data. The Campsite Atlas will serve as a repository for all historical and future monitoring data related to campsites in the CRE. We agree that the imagery collected by the Adopt-A-Beach program provides a useful visual record*

of changes occurring to the camps, particularly at the camps for which no other monitoring data is currently available. Once the GIS framework for the atlas is established, it is our intention to integrate the Adopt-A-Beach data into the Atlas.

Respectfully,

Lynn Hamilton	Executive Director, Grand Canyon River Guides
Andre Potochnik	Adaptive Management Work Group representative
John O'Brien	Technical Work Group representative

GCDAMP Monitoring and Research Plan Comments
Dennis Kubly, Bureau of Reclamation
October 20, 2006

Introduction

Page 1, ¶ 1: The GCDAMP was agreed to in the Oct 1996 ROD, but I think it more accurate to identify its date of origin as January 1997 when the AMWG FACA committee was officially formed.

GCMRC Response: Change will be made.

Page 1, Number 1 (Adaptive Management Work Group): The GCDAMP officially has 25 stakeholders; two Paiute members typically are represented at both TWG and AMWG by a single member, the Southern Paiute Consortium.

GCMRC Response: Change will be made.

Page 1, Number 3 (Technical Work Group): Although not officially stated in the EIS, an important function of the TWG is to make recommendations to the AMWG on program budgets and work plans.

GCMRC Response: Change will be made.

Science Planning Process

Page 1, ¶1: The 5 AMWG priority questions do not address all 12 goals; it is not clear how they are "related to" the 12 goals. Is it agreed that only the top 5 AMWG priority questions will be addressed? Also, didn't the strategic science questions developed in the KAW process address more than the 5 AMWG priorities?

GCMRC Response: *The five priority questions relate in some manner to goals 1-11. It's our understanding that these priorities were provided by the AMWG to specifically assist in setting research, monitoring, and budget priorities. Use of the five questions is consistent with the direction provided in the SSP which was approved by the TWG.*

Page 1, ¶ 3: I do not agree with the following quoted text and its relegation of CMINs and RINs to a lesser importance than the strategic science questions. "Monitoring and research activities are focused on AMWG priority questions and the strategic science questions that grew out of the KAW (Appendix A). In some cases, CMINs and RINs are referenced to clarify the intent of both AMWG priority questions and strategic science questions." I do not recall the SPG ever agreeing to diminish the importance of CMINs and RINs, and I do remember GCMRC committing to the SPG that they would produce a cross-walk table of RINs and strategic science questions. That table does not exist in Appendix A and the priority questions and strategic science questions do not cover the breadth of the CMINs and RINs. The RINs have been sequenced by the TWG, categorized according to their inclusion in the GCDAMP by the AMWG, and included in the

GCDAMP Strategic Plan. No such agreement by TWG or AMWG exists for the strategic science questions and I do not see how this can be done at this stage in the process of adopting the MRP while at the same time diminishing the role of the INs.

GCMRC Response: *The SSP and MRP were developed around AMP Goals, priority questions and related strategic science questions. This decision was based on the advice received by the SAs at the May 2005 SPG meeting to move away from using CMINs, RINs, and instead rely on SSQs. We elected not to include a cross-walk table of RINs and strategic science questions because the practical utility of such a table was unclear to us. Table 2.1 does identify the CMINs and RINS that are not addressed by a SSQ but are relevant to the activities that are proposed. GCMRC will produce such a table if the TWG believes it will improve the MRP.*

Page 2, Figure 1(see also page 2, ¶ 3: This figure contains a box that identifies a 5-Year Score Report interval. The GCDAMP Strategic Plan identifies an "annual State of the Colorado River Ecosystem report prepared by the Grand Canyon Monitoring and Research Center."

GCMRC Response: *GCMRC believes that it is more practical to produce a formal SCORE report every 5 years, not annually.*

Page 2, ¶ 2: The following sentence may need to be revised if it is agreed to engage in another one year budget process in FY 08. "To maintain continuity, the transitional FY07 AWP will provide the foundation for the development of the FY08–FY09 BWP."

GCMRC Response: *Change will be made.*

Page 2, ¶ 3: Strategic science questions again are considered without regard for information needs in planning for monitoring and research.

GCMRC Response: *The specific reference is unclear. See above. INs are still considered but do not receive primary emphasis in the MRP.*

Page 2, ¶ 4: The Humpback Chub Comprehensive Plan is presently a document that was completed in 2003 and is in revision. I suggest referencing it by year so that it becomes clear which version is being cited. If it is finalized before the MRP, the updated version can be referenced.

GCMRC Response: *Change will be made.*

Purpose

Page 3, ¶ 2: In bullet 3, information needs again are dropped in favor of AMWG priority goals/questions and strategic science questions from the KA report.

GCMRC Response*: See response above (Pg 1, Para 3.)*

Core Monitoring Activities

Page 3, ¶ 1-2: The definition of Core Monitoring Activities according to the GCDAMP Strategic Plan seems appropriate, but it and the text that follows do not emphasize that the emphasis on "core" is intended to apply to a restricted set of high priority monitoring projects. The Core Monitoring Ad Hoc Group dealt extensively with the prioritization process, as did the SPG that followed.

GCMRC Response: *We agree that the scope of "core" monitoring projects is limited. The specific scope will be articulated in the General Core Monitoring Proposal (pg 4, paragraph 2, item 1).*

Page 3, Bullet 3: I think the problem of defining precision and accuracy has not been one of disagreement, but rather a failure to get to the point of discussing how the scientists and managers will reach agreement on these important aspects of monitoring and research.

GCMRC Response: *We see both as problems that need to be addressed.*

Page 4, ¶ 1 and following tasks: I do not know how and when GCMRC arrived at the process identified in this section for developing core monitoring projects, but I do not think it agrees with the process developed by the Science Planning Group. I also do not think that the identified process adequately integrates the needs of managers in defining core monitoring needs or in prioritizing those needs. It does not comply sufficiently with GCMRC's Strategic Science Plan in its commitment to integration of scientists and managers in the process.

GCMRC Response: *The process described in the MRP is not contrary to the one developed by the SPG, but rather comes directly from it and builds on it, while streamlining some elements and integrating the established PEP review process within the planning framework. The process involves development of a General Core Monitoring proposal that will be developed based on past Core Monitoring planning efforts and reviewed by the TWG, and an AMP Information Needs Workshop to identify/prioritize manager information needs.*

Page 5, bullets: Why are the Lake Powell water quality and Kanab ambersnail projects deferred until FY09? I thought both had a long history of monitoring and are to be accomplished earlier.

GCMRC Response: *We do not believe these projects are as well developed as other projects slated for core monitoring review. We also scheduled core monitoring reviews over several years to balance the work load.*

Long-Term Experimental Activities

Page 5, ¶ 1: I object (again) to the conclusions drawn by GCMRC in the following statements: "¶Management actions are those activities that provide a demonstrated resource response that no longer require further research. For example, control methods developed for coldwater fish in the 2003–6 research program have been proven effective at reducing the abundance and distribution of rainbow trout within treatment reaches near the confluence of the Little Colorado River (LCR). As such, further GCMRC research on this activity is not included in the MRP. Future

implementation of this action should be carried out primarily by the appropriate land and resource management agencies." At least one of the experimental options (C) clearly identifies coldwater non-native fish control as a subject of continued research. In addition, the Assistant Secretary for Water and Science has directed the TWG and AMWG to proceed on resolving the question of when an experiment becomes a management action using the definition agreed to by TWG and AMWG. This determination is not within the authority of GCMRC, and GCMRC clearly can not make this decision for the land and water management agencies in the GCDAMP.

GCMRC Response: *We stand by our statement that further research on techniques to mechanically control trout is not warranted. We would agree that the effects of this action on native fishes are still subject to further research and monitoring.*

"BHBFs are triggered by predetermined target levels of natural deposits of sediment in the mainstem Colorado River below the Paria and Little Colorado Rivers." I understand this trigger to be a proposal by GCMRC that has been included in the experimental options, but at this time the only sediment trigger agreed to uses inputs only from the Paria River.

GCMRC Response*: GCMRC is proposing adoption of a new trigger based on the results of the Nov 2004 BHBF experiment.*

"In the FY07–FY11 period, GCMRC anticipates two additional BHBF tests. Estimated costs for the monitoring and research associated with the BHBF tests are $1 to $1.5 million per test." Is the projected number of BHBFs determined by what is remaining to be learned from BHBFs, by the probability of sufficient sediment inputs to trigger BHBFs, or by a budget limitation over the course of the five years?

GCMRC Response: *Based on historic record, the sediment trigger would be reached on average 2-3 times in the next 5 years. We used two BHBFs as the basis for determining how much money should be set aside in the experimental fund annually.*

Page 6, ¶ 1: Reclamation first began setting aside funds for flow experiments in 2003. The experimental flow funds actually remain in the Basin Fund until they are transferred from Reclamation to GCMRC. The MRP should be clear on what has been agreed to and what is yet to be considered by TWG and AMWG.

GCMRC Response: *We will change the date of when the experimental fund was established. GCMRC is proposing that the AMP adopt the strategy outlined in the MRP for funding the experimental fund.*

Page 6, ¶ 3: The timeframe in this note is now incorrect. The referenced experiments will not be initiated in FY 2007 and may well not be initiated until FY 09 after NEPA and ESA compliance is completed.
GCMRC Response: *We will change the date based on the outcome of the next AMWG meeting.*

Integrated and Interdisciplinary Science

Page 6, ¶ 1: What does GCMRC mean that it should be possible to "completely address key questions" in no more than 5 years? Are all the strategic science questions considered key questions or just a subset? Is addressing a question the equivalent of answering a question?

GCMRC Response: *The text will be changed to read: An integrated interdisciplinary approach will increase the likelihood of providing definitive answers to strategic science questions.*

Page 7, Figure 1.2: Legend should be updated.

GCMRC Response: U*nclear what change is being recommended.*

Page 8, second bullet: How will the TCD provide "(i)ncreased flexibility to generate hydropower at very low reservoir elevations"?

GCMRC Response: T*his alleged benefit will be removed from the list.*

Page 8, first item number 3: GCMRC should provide release dissolved oxygen levels and citations that demonstrate the reduction in the tailwater trout population could be ascribed to low release dissolved oxygen. They should also identify whether trout numbers and condition were in decline prior to the onset of lower dissolved oxygen releases.

GCMRC Response: *This was only meant to be an example and we do not believe all the suggested detail is needed or desirable.*

Page 9, last paragraph: I have not seen a proposal for climate change studies involving the Bureau of Reclamation. Are these studies already funded?

GCMRC Response*: No, they were included in a USGS FY 08 budget request that was not funded.*

Page 11, ¶ 1: Since core monitoring projects have not been selected, would it be more appropriate to refer to these projects as provisional core monitoring? Also, it is not clear whether GCMRC perceives all monitoring to be core monitoring. Is that clarified in the document?

GCMRC Response: *We believe the definition of core monitoring is adequately explained in the core monitoring section of the MRP. Only monitoring projects that have been designated as core monitoring by the TWG are considered Core Monitoring. Under provisions of the MRP, each designated core monitoring project will be subject to a 5-year review.*

NATIONAL PARK SERVICE
GLEN CANYON NATIONAL RECREATION AREA
COMMENTS
SEPTEMBER 13, 2006 DRAFT MRP

General –

The September 13, 2006 draft MRP is much improved over previous versions regarding organization, format, and focus. The science objectives were removed, the number of questions reduced, and the core monitoring process was described sufficiently well to allow the reader an understanding of what is being proposed. Given this, however, there are still significant concerns in the current version which should be corrected before the document is ready for approval.

The draft MRP fails to follow the AMPSP process for developing the science/resource management questions to be used by GCMRC. As directed by the AMPSP, the TWG/AMWG went through a rather lengthy and arduous process of developing a comprehensive set of prioritized-RINs and CMINs in 2002. Those prioritized RINs provided clear AMP direction and should have served as the foundation for discussion with the TWG to develop a more refined set of science questions to be used in the MRP. Rather than use this foundation, GCMRC independently adopted new process for developing and prioritizing its research needs (now called SSQs) with little TWG input. Once developed, TWG had no input into the set of SSQs/RINs/CMINs/SAQs finally included for individual goals.

GCMRC Response: *The SSP and MRP were developed around AMP Goals, priority questions and related strategic science questions. This decision was based on the advice received by the SAs at the May 2005 SPG meeting to move away from using CMINs, RINs, and instead rely on SSQs. This approach was not "independently adopted" by GCMRC. Rather, it is clearly reflected in the SSP which was approved by the TWG in July 2006 and the AMWG in September 2006; in addition GCMRC presented the shift in approach in several prior presentations on the MRP to the SPG and TWG dating back to the spring of 2006.*

In many cases there is an unclear relationship between the specified SSQs and the proposed projects in that project descriptions failed to show how a particular SSQ would actually be answered by the specified project. In many cases several SSQs appeared to be covered by a single project. I believe GCMRC has an obligation to develop and implement programs designed to specifically answer critical resource questions. Using loose qualifying language such as "address" allows for the continuance of general data gathering activities (under the guise of research) that were never designed to and likely won't answer any of our critical resource questions.

GCMRC Response: *SSQs and INs were used to provide focus to and drive monitoring and research activities for the next 5 years. In some cases, proposed research and monitoring activities are focused on a single SSQ. For example, the Goal 8 research activities are focused almost exclusively on answering the question:*

> *Is there a "Flow-Only" operation (i.e. a strategy for dam releases, including managing tributary inputs with BHBFs, without sediment augmentation) that will restore and maintain sandbar habitats over decadal time scales?*

In other goals, multiple SSQs/INs have been identified owing to the complexity of the issues and current state of knowledge about how to best achieve a goal. For example seven SSQs, two

CMINs and two RINS are identified in the MRP for Goal 2 (Native fish/humpback chub). It is impractical to "answer" all of the questions and IN's within the scope of the 5-year MRP. Answering the stated SSQs/INs will require research and modeling on several fronts over an extended time frame. The philosophy used by GCMRC in preparing the MRP was to identify activities to "address" multiple SSQs based on the belief that proceeding on multiple fronts will provide for a more balanced and robust research program. It should be noted that the Long Term Experimental Activities, which have yet to be defined, will contribute greatly to addressing the identified SSQs/INs. Once the long term experimental program is finalized by the AMP/DOI, GCMRC will develop a long term experimental science plan (LTESP) in cooperation with the AMP. Our intent is that this plan shall be driven by specific hypotheses/science questions.

The process described in the MRP for development of the core monitoring program is contrary to that described with the PCMP and the agreements reached by the CMT/SPG. Ranking and categorization of CMINs as well as defining stakeholder needs are critical first steps in the development of any core monitoring proposal and must be accomplished before a GCMRC proposal can be brought forward for consideration. The MRP must accurately describe the process agreed to by the CMT/SPG and provide a clear schedule for implementation/completion over the next five years.

GCMRC Response: *The process described in the MRP is not "contrary" to the one described in the PCMP, but rather come directly from it and builds on it, while streamlining some elements and integrating the established PEP review process within the planning framework. Ranking and categorization of the CMINs took place within the SPG. While the CMIN prioritization did not follow a true Delphi process as originally envisioned, the SPG members had direct input to that prioritization process, and most SPG members appeared to be comfortable with the end results. The next step will be to have TWG review those revised priorities and (hopefully) bless them without another major round of debate, so we can move on with the implementing next steps (i.e., start to review the projects listed in the MRP that are considered to be "green projects" ready for implementation).*

The general core monitoring proposal that will be prepared by GCMRC in FY07 will summarize the schedule for implementing the various PEP and TWG reviews and the annual information needs workshop (tied to the specific monitoring programs to be reviewed in that year). It will also include a rough cut at the proposed budget allocations for each resource area, so that the PEPs and GCMRC program managers have some realistic guidelines in place ahead of time on which to base monitoring protocol recommendations. We disagree with the statement that "the MRP must accurately describe the process agreed to by the CMT …" since the whole purpose of the SPG planning effort was to take science planning to the next level, and this effort was in direct response to concerns from the science advisors that the process outlined in the PCMP was too cumbersome and not in alignment with a science-based approach to development of a long-term monitoring plan.

While an attempt was made to describe the integration of various GCMRC processes and programs within specific projects, there was still an obvious lack of understanding or lack of discussion regarding important integration requirements. In several instances projects were justified as "addressing" SSQs that related to other resource categories (goals) yet those goals

did not include those SSQs.

GCMRC Response: *The MRP discusses general strategies for integrating research activities across disciplines (collaboration with the SAs, refining the conceptual ecosystem model, hiring a systems ecologist, realigning GCMRC staff). In addition more specific integration opportunities are discussed as part of the discussion of each goal. Even more detail is provided in the FY 07 AWP which was approved by the AMWG. We will review the MRP to rectify the inconsistencies in referencing SSQs noted above. An integrated interdisciplinary approach will be used to develop the LTESP*

Note: *GCMRC did not have time to respond to the questions/comments provided below*

Specific comments:

1. Page iii; there is no spot in the TOC for the Long Term Experimental Plan once completed
2. Page 1, second paragraph; the AMP is made up of 25 stakeholders (not 24)
3. Page 1, Science Planning Process section;
   - This section should mention that the TWG/AMWG not only developed the Goals, MOs and RINs, but prioritized those RINs as well. Given that the MRP goes on to adopt SSQs, it is critical to discuss the interrelationship between the prioritized RINs developed by the TWG, the priority AMWG questions, and SSQs developed by GCMRC.
   - How were the SSQs developed in the KA? (I don't believe they were all developed by the stakeholders at the meeting.) How were they prioritized?
   - Describe the selection/development process by which SSQs developed for Appendix A of the MRP? (Some science questions in the KA were not included in the MRP as SSQs and new SSQs showed up that were not originally in the KA.) Were the science advisors suggested rewrites included?
   - How were the SSQs in the appendix selected for inclusion in the text? (There are fewer SSQs in the text than in the appendix)
   - How were the SSQs in the text selected for inclusion in Table 1.1 (Again there are fewer in the table than in the text.)
   - What was the process for the development and prioritization of SA questions?
   - The implication that the AMP goals, MOs, and RINs could only provide "general" direction is inaccurate. The TWG went through a lengthy process to prioritize the RINs to make them useful. It also went through a deliberate process to determine which RINs were in or out of the AMP.
   - This section should explain how the "5 priority" AMWG questions were derived and why only the five were considered a priority for use in the MRP.
   - The RINs went through a very intensive discussion about which ones were in/out of the AMP. How was the in/out question addressed for the new SSQs/SAQs/?
   - I suggest that this section specify the total number of SSQs developed through the KA process.
   - End of second paragraph; please explain how the RINs and CMINs were used to "clarify" the intent of the SSQs. I saw them as additional questions.
   - Paragraph 4; explain how the MRP is consistent with the AMPSP when the prioritized RINs were not specifically used.

4. Page 2, Figure 1.1;
   - The legend is a bit confusing in stating that the GCDAMP and DOI are responsible for the shaded boxes and GCMRC is responsible for the boxes that are not shaded. (GCMRC is part of DOI.)
   - Explain in the text what is meant by the "Annual Analysis &Report" and the "5-year Analysis and Report." Are these reports required by the AMPSP or is this a recommendation to the AMP from GCMRC?
   - Consider changing AWP to AWP/BWP.
5. Page 2, first paragraph, last line; change AMP to AWP.
6. Page 2, second paragraph; the SPG and BAHG agreed that the '07 budget was to be transitional and not used to justify a continuation of projects in '08. This specifically relates to core monitoring projects.
7. Page 3, first paragraph;
   - The current paragraph is vaguely written and should be more clearly focused. In my view the purpose of the MRP is to clearly identify the high priority science questions (or RINs) that GCMRC will attempt to answer over the next five years. A wide array of general projects can address these questions but only a specifically designed study can hope to answer a particular question.
   - The paragraph specifies that MRP will address priority goals, questions, and information needs specified in the GCDAMP. The GCDAMP only prioritized its information needs.
8. Page 3, second paragraph; how will the MRP build bridges between science and management when the AMPSP prioritized RINs and CMINs are not used?
9. Page 3, core monitoring activities;
   - The first paragraph implies that a PEP is needed followed by several years of testing before a core monitoring project can be implemented. This is not how the PCMP recommended development of core monitoring elements.
   - The last paragraph suggests the PCMP addressed only a few highly developed projects. This is untrue. Projects for all 10 goals were recognized. Only the so called green projects were thought to be ready for initial analysis and didn't need additional R&D at this time.
   - If the PCMP is truly the best guidance now available, why wasn't the process specified in that plan adopted?
10. Page 4, first paragraph; the proposed process to develop core monitoring projects fails to adhere to the process specified in the PCMP and is contrary to the statement on page 3 of the MRP. The PCMP and the CMT proposed the following basic strategy to implement core monitoring components:
    - TWG prioritizes and categorizes CMINs (into truly core monitoring)
    - GCMRC/TWG work together to identify stakeholder needs for each core CMIN
    - GCMRC forwards (to the TWG/AMWG) ongoing resource specific monitoring programs thought to addresses stakeholder needs (the "green" projects). (Each proposal provides answers to the 11 proposal elements listed on page 4.)
    - GCMRC conducts R&D to develop new core monitoring proposals to address core CMINs where no ongoing monitoring program properly addresses stakeholder needs. Once R&D is complete, the project is brought forward to the TWG/AMWG as specified above.

- TWG/AMWG approve the proposal and the core monitoring proposal becomes part of the Core Monitoring Plan
- GCMRC conducts PEPs to ensure that the most up-to-date methods are utilized.

11. Page 4, second column, second paragraph;
    - The PCMP envisioned PEPs after core CMINs and stakeholder needs were identified, and the specific methodologies developed/initially implemented to meet those needs.
    - The next to last sentence specifies that the PEP panel would review programs "deemed adequate" for long-term monitoring. Without identifying stakeholder needs, it is impossible to know what is needed.
    - Without categorization of CMINs and identification of stakeholder needs, it questions the value of previous PEP panel reviews
12. Page 4, second column, last paragraph; PEPs are not necessary as a precursor to move forward with these projects. CMIN categorization and the identification of stakeholder needs are the first steps.
13. Page 5, second column, next to last paragraph; without knowing whether rainbow trout reduction measures had a significant effect on humpback chub, it would seem premature to make any declaration that the technique was ready to be turned over to a management agency. GCMRC should limit its recommendation to whether sufficient science is available to justify continued rainbow trout removal efforts.
14. Page 5, second column, last paragraph;
    - Page 38 seems to contradict (or confuse) the statement here that "two additional BHBF tests" would be needed over the next 5 years.
    - Further, the rationale for two additional tests is needed. Is this estimate based on a specific science plan (SSQs), the number of triggers that might occur over the next five years, or the political reality of the number of tests that might get approved by the AMWG? It would seem GCMRC should make it clear what testing is needed to answer specific SSQs.
15. Page 6, third paragraph; the MRP states that the LTEP will be "incorporated" into the MRP once it is completed. Given that various components of the MRP could easily change once the LTEP is completed, would it not make sense to treat the current MRP as a draft until the LTEP is finalized and incorporated?
16. Page 7, Sediment Dynamics; what are the science questions or RINs that specifically apply to this section, specifically, the need for two BHBF tests?
17. Page 7-8, TCD; as with Sediment Dynamics above, GCMRC activities in this area should address specific science questions and RINs. Also, some of the projects identified in this section, i.e., synthesize Lake Powell water quality, are not found in the goal sections or in the table nor is there a timeframe provided.
18. Page 9, Lake Powell Water Quality; this section inaccurately portrays the Lake Powell program as being outside the AMP. The AMWG agreed and recommended to the DOI Secretary in 1999 that Lake Powell monitoring would remain in the AMP (even though the funding would come from a separate O&M source). Further, the introductory paragraph to this section (page 8) implies that a Lake Powell water quality synthesis is out of the AMP but the current monitoring program is in the AMP. This relationship needs to be clarified.
19. Page 12, Table 1.1;
    - The table would be more useful if the projects were more directly linked to the SSQs, SA questions, CMINs, and RINs. In many instances it is unclear how the specified projects

will "address" the specified questions when they are lumped together. It would be clearer if the table showed individual SSQs, SAQs, RINs, and CMINs and the projects required to answer them.
    - How were the SSQs, or projects selected to be included in the Table since certain SSQs and CMINs and many projects were not included in the table?
    - If projects were not included in Table 1.1 does that indicate that they are not intended to answer the specified SSQs or SAQs?
    - In certain cases individual projects were lumped together in the table. Does this suggest that these individual projects should be combined into a single project within the MRP?
    - Given this lumping, I suggest using project numbers in the table.
20. Page 17, Table 1.1, Recreation; why are no CMINs included in the table yet all prioritized CMINs are listed in the discussion of goal 9 (page 40)?
21. Page 19, first paragraph; why were all the SSQs from Appendix A not included in the text in this section?
22. Page 19, column 2, first paragraph, and page 20, first paragraph; the text specifies that the specified monitoring and research "address" the specified SSQs. Just what does this term mean? Does it imply that the specified program can't answer these questions or that the program is not designed to answer the questions over the next five years?
23. Page 20, Integration; other goals list projects and SSQs that address goal 1, i.e., goal 7 SSQ 3-5; they should be identified and discussed. Also, any BHBF testing for invertebrates should be identified.
24. Page 21;
    - How were the RINs chosen that were listed this section when many other RINs of equal or greater priority were not listed.
    - Why was a 4th priority CMIN used (2.4.1) over higher priority CMINs?
    - SSQ 1-3 should be included (and a project specified) since it was listed in the appendix for implementation FY-07-11.
25. Page 22, Core Monitoring Activities; why is monitoring of humpback chub in three adjacent locations and the monitoring of all fishes all treated as separate projects rather than a combined native fish monitoring project (integration)?
26. Page 22; a project (with BHBFs) should be proposed to evaluate the characteristics of usable near-shore habitat and the use of BHBFs provide that habitat.
27. Page 23, second column, Monitoring Technology Research; the projects in this section should be included in the applicable Core Monitoring projects rather than standalone projects
28. Page 23; this section should specify how the MRP will address the GCDBO elements regarding native fish including measures/research needed to address razorback sucker?
29. Page 24, Integration; the integration with other resource goals should be specified here. Specifically, BHBF testing for near shore habitat, and goal 6 (SSQ 4-2).
30. Page 26, first paragraph;
    - This paragraph should specify that before a PEP is conducted that the other core monitoring process questions will be addressed as well, i.e., categorization of CMINs, identification of stakeholder needs, development of a core monitoring proposal etc.
    - The term "primary" is used in reference to the science questions and information needs. Please explain the meaning of primary in this context. Primary implies most important yet a low priority RIN was used to support this program.

- This section or a previous goal should incorporate all relevant SSQs specified in Appendix A, specifically, SSQ 1-3.

31. Page 26, Core Monitoring Activities; the current monitoring program utilizes a specific metric (CPUE) not consistent with the metric requirements of the AMPSP (population levels). This problem should be identified and a solution proposed.
32. Page 27; this goal has no relevant SSQs or AMWG priority questions yet genetic research and LTEP experimental analysis are proposed. Without specific science questions there is an obvious lack of focus of these endeavors and not, therefore, consistent with the process specified on page 1 of the MRP.
33. Page 29, first column;
    - The text specifies that the monitoring and research activities specified are intended to "address" listed SSQs and CMINs. The term address implies no intention to specifically answer the specified SSQs. As such, the proposed research and monitoring activities are not sufficiently focused. The MRP should specify programs that will answer the highest priority SSQs.
    - SSQ 4-2 directly relates to native fish yet it is not listed in the native fish section. It is unclear how this SSQ will be answered by the specified projects since they are mostly monitoring in nature.
    - SSQ 2-1 is also listed under Goal 11 showing that there is a priority relationship between the two resource categories. However, it is unclear how monitoring data will be used to answer the question posed in this SSQ.
    - How do the identified CMINs clarify (as specified on page 1) the listed SSQs?
34. Page 29, second column; description of the monitoring projects specifies yearly transects and annual monitoring activities. This is inappropriate in the MRP since the vegetation program has yet to undergo core monitoring review as specified on page 1.
35. Page 30, column 1; please explain why a synthesis project utilizing existing data should take five years.
36. Page 30, column 2; two additional SSQs are mentioned in this section (1-5 and 3-2). Why were they not listed in the section entitled Strategic Science Questions and Information Needs? These additional SSQs relate to fish health but the fish section does not include them suggesting the information is not a priority.
37. Page 30, column 2; from the description of the projects it is unclear how they will answer the specified SSQs. Further, since several projects utilized digital imagery from DASA, the integration of DASA with this goal should be discussed
38. Page 31, column 1; SSQ 3-5 is specified as a priority question to be answered with the proposed projects and specifically relates to invertebrate flux, however, SSQ 3-5 is not listed within Goal 1 as a priority question. How can a question be a high priority for water quality when it is not a high priority for goal 1?
39. Page 31, column 2; none of the CMINs specified on this page address suspended sediment yet the project identified on page 32 specifies silt/clay monitoring in the mainstem and tributaries
40. Page 35, second paragraph; SSQ 4.1 is identified as the "most critical" SSQ for goal 8. How did this "most critical" category get determined?
41. Page 35, Core Monitoring Activities; the core monitoring elements specified are not the ones identified in the AMPSP as CMINs. Please explain how the new list of core monitoring elements was developed.

42. Page 36, Table 2.2; core monitoring elements identified are the same as those identified in goal 7 (page 32). Are these different projects?
43. Page 39, Integration; integrating BHBF testing for other resource needs should be discussed in this section.
44. Page 40, column 2; the author specifies the prioritized CMINs as developed by the CMT/SPG. This makes sense if the monitoring projects are designed to address each CMIN but begs the question as to why the other goals do not do the same.
45. Page 41, Status and Trends in Recreational Angling; this section does not contain a relevant SSQ or CMIN, nor does the referenced goal 4 contain a relevant SSQ or CMIN.
46. Page 42, LTEP; the section discusses the need to understand effects of BHBFs on beach morphology, size, and distribution; as well as the recreational fishery. However, there is no program proposed for monitoring/studying angling satisfaction.
47. Page 42, Integration; this section should discuss those projects that overlap between goals, i.e., vegetation encroachment
48. Page 43, Integration/Biological Sciences; this section specifies that trout condition and angler satisfaction will be measured yet no project is specified to accomplish this task under the recreation or rainbow trout goals. The proposal responds to CMIN 4.1.4.
49. Page 47, second column; please explain why SSQ 2-3 is different than what is listed in Appendix A. How were the SSQs chosen since all in Appendix A are not used?
50. Page 50, Integration; the projects that specify remote sensing should be discussed in reference to the appropriate DASA project listed on page 55.
51. Page 55, Legacy Analog Data Conversion; the integration of this project with specific resource goals and SSQs and CMINs should be discussed.
52. Page 55, Mapping Shoreline Habitat Changes; this project appears to directly supports goal 2 efforts yet is not even mentioned as a priority need for goal 2.