

Glen Canyon Dam Adaptive Management Work Group
Agenda Item Information
April 29-30, 2009

Agenda Item

Review of FY10-11 Priorities, Preliminary Budget, and Hydrograph

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Action Requested

√ **Motion requested.** The following motion is proposed by the Grand Canyon Wildlands Council AMWG member. More information on this motion is included under “Background Information,” below.

In recognition of GCDAMP Goal 3 and towards management of the Colorado River through an ecosystem approach, AMWG establishes the Species of Concern Ad Hoc Group, co-led by Grand Canyon Wildlands Council, NPS, and FWS, and charges it to produce a report by May 1, 2011 that contains the following with regard to extirpated species and other species of management concern in the CRE:

- a review of information about and assessment of the status, habitat needs, and ecosystem roles of the species, and
- recommendations on options and costs for improved stewardship of the species, including the potential for re-establishment / reintroduction.

AMWG further allocates \$50,000 to support development of the report.

√ **Motion requested.** The following motion is proposed by the Grand Canyon River Guides AMWG member. More information on this motion is included under “Background Information,” below.

AMWG recommends to the Secretary of the Interior that during FY10-11 the next High Flow Experiment occur when the revised sediment trigger criteria are reached, as described in U.S. Geological Survey, 2006.

- √ **Motion requested.** The following motion is proposed by the Grand Canyon River Guides AMWG member. More information on this motion is included under “Background Information,” below.

AMWG recommends to the Secretary of the Interior that during FY10-11, equalized monthly volumes be released from the dam to determine if sediment can be sustained and near shore habitat stabilized over the long term (Wright et. al., 2008).

- √ **Motion requested.** The following motion is proposed by the Technical Work Group. More information on this motion is included under “Background Information,” below. Note that those aspects of the TWG motion that asked AMWG to direct DOI agencies to take action have been modified to request the TWG to work with those agencies, in order to preclude the necessity of a recommendation to the Secretary of the Interior at this stage of budget development. Also, please note that no motion is presumed to be made unless and until an AMWG member makes the motion in accordance with the AMWG Operating Procedures.

AMWG gives the following direction to the TWG as it continues to work with BOR and GCMRC to develop a proposed budget, workplan, and hydrograph for FY 2010-11 for consideration by AMWG at its next meeting:

1. Continue to develop a budget based on an annual operations hydrograph for FY 10 and 11 water years of MLFF with fall steady flows in September and October.
2. Move funding for “Mainstem Non-native Mechanical Removal” back to line 74 under the GCMRC budget and add funding for an additional removal trip.
3. Develop a general proposal incorporating technical information for a geomorphological model to evaluate dam effects on cultural sites.
4. Work with the CRAHG, GCMRC, and BOR to do the following:
 - a. Provide an explanation of current funding line items (more explicit description of accounting) and how they relate to the treatment plan and necessary compliance, including lines: 23, 31, 114, and relevant portions of lines 39-43.
 - b. Describe why the treatment plan cannot be fully implemented using the current line items described above, specifically the \$500,000 allocated in line 31 and ~ \$147,000 in line 23.
 - c. Discuss the necessity of the \$70,000 for the NPS (line 114).
5. Develop a discussion paper on the pros and cons of the two budget approaches described in Issue of Concern #9, for submittal to AMWG at its August meeting.
6. Continue to address the following issues of concern:
 - a. **General comment on core monitoring:** The budget assumes that we will have moved forward on core monitoring for a number of Goals under the AMP. Although this is reasonable to consider TWG believes it is premature. TWG will begin to consider the General Core Monitoring Plan this summer and from there will have a better idea what may constitute core monitoring. TWG should, within the core monitoring discussion, evaluate cost-effectiveness of current monitoring programs (precision, accuracy, cost

trade-offs). GCMRC is planning a core monitoring workshop before the next TWG meeting to discuss the draft plan.

- b. **General comment on the workplan.** TWG is looking for additional clarity in the workplan on staff funding including a current GCMRC organizational chart. TWG requests the following: (a) that staff time for individual projects be allocated under those projects, (b) time be allocated in the workplan such that a substantial amount of time, about 20%, is allocated to writing reports and publications, and (c) any new staff additions or deletions be clearly outlined in the budget introduction and appropriate projects.
- c. **General comment on Goal 10.** There is a lack of economic analysis capacity in the program to evaluate trade-offs or other economic concerns. Additional capacity should be considered. Unknown funding needs at this time.
- d. **Line 74:** Priorities and funding under Goal 2. GCMRC should provide an explanation of where funding used in FY 2009 for Mainstem Non-native Mechanical Removal has been reallocated within the program.

GCMRC response: There are two primary budget items that received the money (\$141,023 in 2009) previously allocated for the mainstem removal project:

- 1. The salaries at USFWS, AZGFD, and USGS are only going up each year. GCMRC always receives requests for more funding for salaries from the cooperators each year, and USGS salaries also increase.
 - 2. An additional \$25,000 was provided for the remote PIT tag project in 2010 to provide for more equipment and the expertise to install it. This project has, to date, received broad support from the fish cooperators (primarily FWS, AZGFD, GCMRC, and BOR) because of its potential to reduce personnel costs in the future to get the same, or even more, data on the tagged fish (primarily HBC) that use the LCR.
- e. **General comment on accounting.** Currently, BOR does not have adequate staff resources to track reports due by GCMRC from the workplan. Thus, there is inadequate tracking of deliverables by the AMP for projects funded by BOR funds. BOR should investigate options to provide staff resources in tracking reports.
 - f. **Goal 8:** GCMRC should develop an on-the-shelf HFE science plan for a potential next HFE.
 - g. TWG understands that GCMRC will attempt to provide historical expenditures by project (going back 3 years) in the workplan.
 - h. **Goal 2 (line 67):** AMWG should be aware that the implementation of the warm-water non-native control plan efforts in 2011 may have budget implications (moving from the testing phase to non-native control implementation).
 - i. **Goal 2:** GCMRC should investigate research into determining the natal origins of trout in the LCR reach of the mainstem. This investigation should consider the feasibility of whether to specifically target juvenile fish that are not currently being tagged.
 - j. **Budget general.** GCMRC should disclose the total “burden” for each budget line item, the amount of carry-over for each budget line item, and that a crosswalk be provided from the 2009 budget to the 2010 and 2011 budget so that changes in the budget/workplan for each item can be understood.
 - k. AMWG should evaluate the prioritization of program areas (to satisfy compliance concerns).

Presenters

Dennis Kubly, Chief, Adaptive Management Group, Upper Colorado Region, Bureau of Reclamation

John Hamill, Chief, Grand Canyon Monitoring and Research Center, U. S. Geological Survey

Shane Capron, Chair, Technical Work Group

Previous Action Taken

- ✓ **By AMWG:** At its August 2004 meeting, AMWG agreed to a 2-year budget and workplan development process that was recommended to them by TWG.

- ✓ **By AMWG:** At its August 2004 meeting, AMWG approved the following program priorities:
 - Priority 1: Why are the Humpback chub not thriving, and what can we do about it? How many Humpback chub are there and how are they doing?
 - Priority 2: Which cultural resources, including TCPs, are within the APE, which should we treat, and how do we best protect them? What are the status and trends of cultural resources and what are the agents of deterioration?
 - Priority 3: What is the best flow regime?
 - Priority 4: What is the impact of sediment loss and what should we do about it?
 - Priority 5: What will happen when we test or implement the TCD? How should it be operated? Are safeguards needed for management?

- ✓ **By TWG:** At its March 2009 meeting, TWG members resolved the following budget items. These indicate TWG's direction for the FY10-11 budget that will be followed unless otherwise directed by AMWG.
 1. **Line 1:** CPI could be lower than the projected 3% in the preliminary budget, therefore budgets could be affected if CPI is substantially lower. The upper basin RIP has been instructed to consider level funding for 2010 and 2011, and similar concerns have been raised at the NPS. This may need to be adjusted in the final budget recommendation, and could result in program cuts.

Resolution: GCMRC/BOR agreed to bring a budget forward that reflected either a 0% CPI or other % based on current conditions and expectations as reported monthly by the Bureau of Labor Statistics.
 2. **Line 15:** The "TWG Chair Reimbursement" should be expanded to include the ability to pay for limited facilitation when funds are not expended to pay for a TWG Chair. TWG requests BOR draft a final budget recommendation that changes line 15 to "TWG Chair or Facilitation Expenses."

Resolution: BOR will make the change in the final budget.
 3. **Line 19:** Compliance documents. This line item should be funded with the consideration that there may be compliance costs in any given year, but especially in 2012 when new compliance documents will be necessary to consider the next operation period after the 5-year program. If the money is not used in any given year, it should revert to the experimental fund, but be tracked and available for use in the future as a lump sum if needed for our compliance needs in 2012 (e.g., new biological opinion, NEPA, planning post-2012).

Resolution: This funding was agreed to except that the money will remain in the line and be carried over from year to year and NOT moved to the experimental

fund. Members were concerned that if it moved to the EF that it would get tapped for other activities. BOR concurred.

4. **Line 74:** Mainstem Non-native Mechanical Removal, this project was removed by GCMRC.
Resolution: TWG replaced this funding in the GCMRC budget and requests AMWG concurrence as described in #2 of the proposed AMWG motion from TWG (above). This remains as TWG Issue of Concern #1 (below).
5. **Line 31:** Canyon Treatment Plan and Implementation.
Resolution: TWG agreed that the treatment plan (line 31) would not be increased annually by CPI. BOR concurred, but identified that the \$200,000 reduction in the FY 2008 (\$500,000 initial request reduced to \$300,000) would have to be reinstated to finish this work.
6. In the 2010-11 budget, a number of research projects were bundled or aggregated into large funded entities. The premise by GCMRC is that these projects are integrated and will be Core Monitoring. We are concerned that this process is getting ahead of TWG because TWG has yet to review the general core monitoring plan which will be discussed starting this summer. GCMRC has agreed to prepare a general core monitoring plan for approval before implementing new core monitoring projects.
Resolution: GCMRC agreed to retain the detailed information in the workplan for any “bundled” projects and to address the SSQs directly in the workplan so that we can see how the individual components are responding to our science questions. The larger issue of core monitoring remains as Issue of Concern #4 (below), and #6a in the TWG-proposed AMWG motion (above).
7. Projects under Goal 2, line 58, are preliminary pending the PEP recommendation this summer and TWG review and recommendations.
Resolution: TWG and GCMRC are in concurrence on this item.
8. For **extirpated species**, line 77, no funding is specifically being proposed by TWG, but some work may be occurring in the MSCP using razorback suckers from upper Lake Mead to repatriate lower reaches of the Colorado River in the Grand Canyon.
9. **Goal 7.** The two NASQAN stations in Grand Canyon (Diamond Creek and Lees Ferry) were discontinued in 2007. The surface water (stage and discharge) record at the Diamond Creek and Lees Ferry gages will continue and is funded outside the AMP. Records of sediment flux, temperature, and dissolved oxygen at Diamond Creek have been funded through the AMP and will continue in FY10-11. Sampling at the Lees Ferry gage for some chemical analyses has been continued by Arizona Water Resources. TWG believes that the AMP should be fully aware of this situation, but is not advocating for the use of AMP funds for NASQAN data collection in FY 10-11. TWG believes that outside funding sources should be developed to support the continuation of the NASQAN sampling at Diamond Creek.
Resolution: TWG and GCMRC are in concurrence on this item.
10. **Goal 10 (NEW):** GCMRC should develop an economic valuation study for 2010-11 (socio/cultural program area). The purpose would be to quantify the various resource values (market/non-market) for Lake Powell and the river corridor within Grand Canyon and Glen Canyon.
Resolution: The TWG debated this action and generally felt that is wasn't ready for serious discussion. Mr. Henderson agreed to come back to the TWG in June with a more detailed request for TWG to consider.
11. **Line 127:** A line item should be added under the DASA portion of the budget which utilizes DASA funds to analyze historic aerial photos and determine the best method for use in

change detection for sediment resources as a pilot test or proof of concept at a limited number of campsites. This will involve unbundling of a portion of the DASA budget. TWG understands that GCMRC will work with TWG to seriously consider this request during the development of the workplan and priorities within the DASA program.

Resolution: The NPS agreed to work with GCMRC on this project.

12. Mike Breedlove's analysis and reporting, under **line 128**, should be unbundled from other line items and included as a separate line item. FY10 should be devoted to reporting and publication of results with an emphasis on how GIS methods/results compare to existing sediment monitoring and where this project fits into the overall sediment program. TWG understands that GCMRC will work with TWG to seriously consider this request during the development of the workplan and priorities within the DASA program.

Resolution: The NPS agreed to work with GCMRC on this project.

13. **High Flow Experiment (HFE).** The current compliance documents describe an action which included only one HFE from 2008-2012. However, beginning in 2010, approximately \$400k may be available from the experimental fund (Line 22) to support an HFE, and about \$900k in 2011 (if unused in 2010). John Hamill proposed in his budget memo that an HFE study could be undertaken for about \$500k to \$750k (the 2008 HFE cost over \$3 million).

We did receive a number of comments on whether or not an HFE should be considered in the FY 2010-11 budget. Dennis Kubly and Shane Capron (TWG Co-chair and Chair) discussed this thoroughly and have concluded that this was not ripe for TWG discussion beyond the technical aspects. The TWG will consider the budget implications of an HFE in the 2010-11 budget if so directed by AMWG.

Resolution: AMWG will consider this issue in April and provide direction to TWG.

14. **Line 71:** GCMRC should provide clarification on when TWG will receive a report on this native fishes habitat data analysis project which was funded from FY07-FY09. The report should relate to the work described in the workplan.

Resolution: GCMRC will provide a written explanation/response.

15. **Goal 12 (NEW):** GCMRC should add a line item for the development of a new SCORE report and Knowledge Assessment in FY 2010.

Resolution: AMWG should be aware that the MRP includes a plan to have a SCORE report and KA every 5 years, but they are not in the GCMRC budget for FY10-11.

16. **Budget general.** GCMRC should identify how/where cuts were made due to the budget shortfall they experienced in the development of the budget.

Resolution: GCMRC will provide additional information on this during the development and explanation of the workplan and will work with the BAHG to provide the general areas where the early draft of the budget needed to be reduced.

17. **Goal 1:** GCMRC should develop a research plan to determine effects of current ramping rates on food base and drift, and include this within the food base program.

Resolution: GCMRC will look at this issue as part of the near-shore ecology study.

- ✓ **By TWG:** At its March 24, 2009 conference call, TWG members approved the following motion by a vote of 15-1:

TWG has reviewed the preliminary FY 2010-11 biennial budget provided by GCMRC and BOR and is forwarding that budget to AMWG along with a list of concerns for AMWG consideration and feedback. This recommendation is based on the Budget Development

Process approved by AMWG at their August 2004 meeting. The TWG will work with GCMRC and BOR to develop a final budget recommendation for FY 2010-11 and a proposed workplan over the summer; incorporating AMWG input on the “issues of concern”, further considerations based on the draft workplan (provided by GCMRC before June 8, 2009), and other considerations.

TWG recommends the annual operations hydrograph for FY 10 and 11 water years be MLFF with fall steady flows in September and October.

TWG recommends that the “Issues of Concern” (listed below) be resolved and either incorporated into the budget or documented in writing why such is not appropriate. TWG requests either AMWG concurrence with the TWG recommendations on the “Issues of Concern” or further direction.

Issues of Concern:

1. **Line 24:** Mainstem Non-native Mechanical Removal. BOR has placed funding for this project in their portion of the FY 2010-11 budget in response to GCMRC removing this project from their proposed budget (see line 74). The TWG believes that since this activity was included in the conservation measures within the 2008 Biological Opinion that it must be funded and carried out in 2010 and 2011 and should be carried out by GCMRC.

Recommendation: TWG recommends that AMWG direct TWG to develop a final budget recommendation that moves the funding for “Mainstem Non-native Mechanical Removal” back to line 74 under the GCMRC budget and that GCMRC add an additional removal trip. The resulting cost would be about \$300,000.

2. **Goal 11 (NEW):** GCMRC should develop a general proposal for a project that would develop a geomorphological model to evaluate dam effects on cultural sites.

Recommendation: TWG recommends that AMWG direct TWG and GCMRC to develop a general proposal incorporating technical information for a geomorphological model to evaluate dam effects on cultural sites.

3. **Cultural program:** three proposals for additional projects were requested by the CRAHG with no specific funding source provided: (a) Line 114, add back in \$70k to the NPS, (b) NEW: Preservation Treatments, about \$36,450, and (c) NEW: Tribal 106 support of about \$60k. These projects are considered by the CRAHG to be important for the support and implementation of management actions/compliance under Section 106. These activities are described in the BOR treatment plan, but are currently not being fully carried out. CRAHG is concerned that this year’s treatment plan is primarily an excavation/data recovery plan and that other important components of the treatment plan are not being implemented with the funding currently available. Further, it may be that the \$500k per year generally agreed to by AMWG for treatment of these sites may not be sufficient and further work at each of the treated sites is possible.

Recommendation: TWG recommends that AMWG direct TWG to work with the CRAHG, GCMRC, and BOR to determine the following before proposing a final budget:

- Provide an explanation of current funding line items (more explicit description of accounting) and how they relate to the treatment plan and necessary compliance, including lines: 23, 31, 114, and relevant portions of lines 39-43.

- Describe why the treatment plan cannot be fully implemented using the current line items described above, specifically the \$500k allocated in line 31 and ~\$147k in line 23.
 - Discussions should occur between the NPS/GCMRC/BOR on the necessity of the \$70k for the NPS that was dropped this year from GCMRC's cultural budget (line 114). DOI agencies should discuss this and determine who is responsible for that funding and provide a response to the TWG by May 22. The TWG voted to recommend returning this funding to line 114 but it failed.
4. **General comment on core monitoring:** the budget assumes that we will have moved forward on core monitoring for a number of Goals under the AMP. Although this is reasonable to consider TWG believes it is premature. TWG will begin to consider the General Core Monitoring Plan this summer and from there will have a better idea what may constitute core monitoring. TWG should, within the core monitoring discussion, evaluate cost-effectiveness of current monitoring programs (precision, accuracy, cost trade-offs). GCMRC is planning a core monitoring workshop before the next TWG meeting to discuss the draft plan.
 5. **General comment on the workplan.** TWG is looking for additional clarity in the workplan on staff funding including a current organizational chart. TWG requests the following: (a) that staff time for individual projects be **allocated** under those projects, (b) time be allocated in the workplan such that a substantial amount of time, about 20%, is allocated to writing reports and publications, and (c) any new staff additions or deletions be clearly outlined in the budget introduction and appropriate projects.
 6. **General comment on Goal 10.** There is a lack of economic analysis capacity in the program to evaluate trade-offs or other economic concerns. Additional capacity should be considered. Unknown funding needs at this time.
 7. **Line 74:** Priorities and funding under Goal 2. GCMRC should provide an explanation of where funding used in FY 2009 for Mainstem Non-native Mechanical Removal has been reallocated within the program.

GCMRC response: There are two primary budget items that received the money previously allocated for the mainstem removal project:

 - The salaries at USFWS, AZGFD, and USGS are only going up each year. GCMRC always receives requests for more funding for salaries from the cooperators each year, and USGS salaries also increase.
 - An additional \$25,000 was provided for the remote PIT tag project in 2010 to provide for more equipment and the expertise to install it. This project has, to date, received broad support from the fish cooperators (primarily FWS, AZGFD, GCMRC, and BOR) because of its potential to reduce personnel costs in the future to get the same, or even more, data on the tagged fish (primarily HBC) that use the LCR.
 8. **General comment on accounting.** Currently, BOR does not have adequate staff resources to track reports due by GCMRC from the workplan. Thus, there is inadequate tracking of deliverables by the AMP for projects funded by BOR funds. BOR should investigate options to provide staff resources in tracking reports.
 9. **General comment on the budget process.** AMWG approved a two-year rolling budget process at their August 2004 meeting. This is the first year that a two year budget has been attempted since that approval. In developing this budget, two options for a budget process were discussed. First, is the rolling budget approved by AMWG in 2004.

Second, is a two-year budget that would only be modified slightly in year two, thus requiring much less effort in the second year. This could save valuable time and resources to work on other AMP concerns.

Recommendation: TWG recommends that AMWG direct TWG to develop a discussion paper on the pros and cons of the two budget approaches and respond back to AMWG at their August meeting with an initial review.

10. **Goal 8:** GCMRC should develop an on-the-shelf HFE science plan for a potential next HFE.
11. TWG understands that GCMRC will provide historical expenditures by project (going back 3 years) in the workplan.
12. **Goal 2 (line 67):** AMWG should be aware that the implementation of the warm-water non-native control plan efforts in 2011 may have budget implications (moving from the testing phase to non-native control implementation).
13. **Goal 2:** GCMRC should investigate research into determining the natal origins of trout in the LCR reach of the mainstem. This investigation should consider the feasibility of whether to specifically target juvenile fish that are not currently being tagged.
14. **Budget general.** GCMRC should disclose the total “burden” for each budget line item, the amount of carry-over for each budget line item, and that a crosswalk be provided from the 2009 budget to the 2010 and 2011 budget so that changes in the budget/workplan for each item can be understood.
15. AMWG should evaluate the prioritization of program areas (to satisfy compliance concerns).

Relevant Science

N/A

Background Information

AMWG PRIORITIES AND THE BUDGET

Please see the attached memorandum (starting on page 14) from John Hamill, Chief, Grand Canyon Monitoring and Research Center for a description of the budget as it relates to AMWG’s priorities, as well as his responses to the TWG Issues of Concern.

TECHNICAL WORK GROUP BUDGET PROCESS

The FY 2010-11 budget is the first biennial budget to be developed by the GCDAMP. The Budget Ad Hoc Group (BAHG) received input from the Cultural Resources Ad Hoc Group and GCMRC as described in the 2004 budget procedure. Following the initial meeting, GCMRC developed a draft budget for BAHG review and consideration. The BAHG held one meeting and four conference calls prior to submitting a recommendation to the TWG. On March 16-17, 2009, the TWG met, considered the BAHG recommendation, resolved several budget issues, identified those issues that should remain for AMWG consideration, and worked on a budget recommendation for AMWG. Due to a lack of quorum at the time of the vote on the draft budget, the TWG held a final conference call on March 24, 2009, at which time a motion referring the remaining budget issues to AMWG was adopted by a vote of 15 yes – 1 no.

GRAND CANYON WILDLANDS COUNCIL

Proposed motion: In recognition of GCDAMP Goal 3 and towards management of the Colorado River through an ecosystem approach, AMWG establishes the Species of Concern Ad Hoc Group, co-led by Grand Canyon Wildlands Council, NPS, and FWS, and charges it to produce a report by May 1, 2011 that contains the following with regard to extirpated species and other species of management concern in the CRE:

- a review of information about and assessment of the status, habitat needs, and ecosystem roles of the species, and
 - recommendations on options and costs for improved stewardship of the species, including the potential for re-establishment / reintroduction.
- AMWG further allocates \$50,000 to support development of the report.

Goal 3, referenced in the GCWC motion above, was recommended to the Secretary of the Interior by AMWG as part of the AMP Strategic Plan on January 17, 2002, and reads as follows:

“Goal 3. Restore populations of extirpated species, as feasible and advisable.”

Larry Stevens, Grand Canyon Wildlands Council, has written a draft white paper entitled: *The status, ecological role, and potential for reintroduction of species extirpated from the Colorado River Ecosystem, Glen and Grand Canyons, Arizona*. He emphasizes that this paper is a draft and that he welcomes any comments and edits on the document. The full document can be found at <http://www.usbr.gov/uc/rm/amp/amwg/mtgs/09apr29/index.html>. The executive summary of the paper is below.

Executive Summary

The removal of ecologically important foundation taxa (e.g., dominant trees, abundant prey taxa), keystone species (e.g., those that influence trophic structure and composition), or previously abundant species, as well as the substitution of non-native taxa in those roles, affects the structure, composition, function, resilience, and goods and services of ecosystems, such as the Colorado River ecosystem (CRE) affected by Glen Canyon Dam in Glen Canyon National Recreation Area and Grand Canyon National Park, Arizona. The CRE is managed directly by the National Park Service (NPS) and the Secretary of the Interior is advised on dam management by the Adaptive Management Work Group (AMWG). Understanding the distribution and ecological roles of native species no longer present in regulated river ecosystems, such as the CRE, is limited by uncertainties about the pre-dam condition of populations and ecosystem structure; nonetheless, effective ecosystem management and rehabilitation requires accounting for missing species and ecological functions that characterized the natural ecosystem. Decisions about which native species and functions should be and can be restored, and which non-native species can be tolerated, remains the purview of well-informed ecosystem stewards (Schmidt et al. 1998).

Like other great NPS ecosystems, the CRE has lost native species despite the highly protected status of its lands (Newmark 1995; Stevens et al. 2001). Most species-based management attention is focused on federally listed species, as well as on economically important taxa. However, federally endangered species do not necessarily serve as adequate ecological “umbrellas”, protecting other species or ecosystems (Angelstam and Roberge 2004), particularly in complex landscapes like the canyons of the Colorado River (Stevens et al. 2001). Extirpated species that are not federally listed may have important ecological roles, and their loss may greatly compromise ecosystem

function. Also, little scientific attention has been paid to the distribution and status of rare and endemic taxa in the CRE, particularly invertebrates, for which few status or life history data exist. Ecosystem integrity can be jeopardized by insensitive resource management practices: focus on single-species management can trade off conservation of other non-listed species, and non-listed species and important ecosystem functions may disappear without notice (Simberloff 1998, Stevens et al. 2001), Stevens and Polhemus 2008). Goal 3 of the Glen Canyon Dam AMWG is to “Restore populations of extirpated species, as feasible and advisable” to the CRE; however, the AMWG has not made recent progress on that goal. Achieving that goal requires a review of information on the distribution, status, ecological role(s), and potential for reintroduction of extirpated species and other taxa of management concern in the CRE.

We describe distribution, ecological role(s), status, potential for reintroduction, and the quality of information available on missing or imperiled CRE species. We present a list of the federal- and state-listed and non-listed species known to have been extirpated, those apparently nearing extirpation, and those for which insufficient data exist to determine present status in the CRE. Preliminary analysis of those data suggest that at least 34 species of plants and animals may have been extirpated from the CRE or may be seriously declining there since the closure of Glen Canyon Dam in 1963, and the status of at least 10 other species in the CRE is uncertain. The list includes at least: 2 plants, 5 invertebrates, 5 fish, 2 amphibians, 1 reptile, 8 birds, and 11 mammal species. Of these, only one invertebrate, 4 of the 5 fish, and 5 bird species are or recently have been federally listed. The amount and quality of ecological and monitoring attention is relatively great for endangered CRE humpback chub (*Gila cypha*), Kanab ambersnail (*Oxyloma haydeni kanabensis*), and southwestern willow flycatcher (*Empidonax trailii extimus*) in the CRE. Some ecological, but inadequate monitoring data, are available for bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), and California condor (*Gymnogyps californianus*), but erratically occurring listed species (e.g., brown pelican, *Pelecanus occidentalis*), and the ecology and fate of non-listed declining or extirpated species have largely been ignored.

We discuss strategies for filling information gaps about these species, how to evaluate the potential for reintroduction of extirpated species, and the compliance requirements of AMWG cooperating agencies that may be needed to partner in reintroduction efforts, specifically those of the National Park Service, the Fish and Wildlife Service, and the Arizona Game and Fish Department. We present this information as background for a draft motion to the AMWG and the Secretary of the Interior at the springtime 2009 AMWG:

In recognition of GCDAMP Goal 3 and towards management of the Colorado River through an ecosystem approach, AMWG establishes the Species of Concern Ad Hoc Group, co-led by Grand Canyon Wildlands Council, NPS, and FWS, and charges it to produce a report by May 1, 2011 that contains the following with regard to extirpated species and other species of management concern in the CRE:

- a review of information about and assessment of the status, habitat needs, and ecosystem roles of the species, and
- recommendations on options and costs for improved stewardship of the species, including the potential for re-establishment / reintroduction.

AMWG further allocates \$50,000 to support development of the report.

A more thorough examination of extirpated and at-risk species is recommended to improve the understanding and integrated management of the CRE as an ecosystem, and help achieve AMWG Goal 3.

GRAND CANYON RIVER GUIDES

Motion #1: Preparation for the next potential High Flow Experiment in WY 10-11.

Proposed motion: AMWG recommends to the Secretary of the Interior that during FY10-11 the next High Flow Experiment occur when the revised sediment trigger criteria are reached, as described in U.S. Geological Survey, 2006.

The High Flow Experiment (HFE or BHBF) has scientifically proved its utility to rebuild sandbars when conducted under sediment-enriched conditions.⁴ AMWG and the scientific community broadly recognize the importance of the sand resource as a critical ecosystem component for multiple natural resources, including rejuvenation of near shore habitat for native fishes, availability of aquatic food base, rebuilding of camping beaches for recreation, and buttressing of archeological sites to reduce erosion of these antiquities and the native cultural heritage.¹

The HFE is one of the most important tools of dam re-operation available for satisfying the intent of the Grand Canyon Protection Act. The HFE should be further tested and refined for optimal use in the furtherance of AMP goals.¹ Large influx of tributary sediment below the dam will certainly occur in the future.² Program requirements for compliance activities, scientific preparation, permitting, and budgeting would be more efficiently completed if anticipated and planned in advance.¹ The revised sediment trigger is a common element of all earlier proposals for a HFE and is broadly accepted by stakeholders as a potentially important refinement of the HFE.³ The TWG in consultation with GCMRC may provide additional refinements to the next HFE that would advance our understanding of this important tool.¹

Motion #2: Testing equalized monthly volumes in WY 10-11.

Proposed motion: AMWG recommends to the Secretary of the Interior that during FY10-11, equalized monthly volumes be released from the dam to determine if sediment can be sustained and near shore habitat stabilized over the long term (Wright et. al., 2008).

Scientists emphasize the importance of smoothing and/or eliminating the abrupt changes in monthly volumes released from the dam to reduce sand bar erosion and move toward a sustainable sediment flux through the CRE.^{1,4} Preliminary results of recent modeling by GCMRC shows a 20% reduction of sand transport with equalized monthly volumes (EMV) compared to monthly volumes as released in WY2008. The large numerical uncertainties around this number can be reduced with an experiment that actually measures the results. An EMV experiment could be conducted following the next HFE as a direct comparison with the 2008 HFE and its subsequent releases. Or, a different EMV experiment could be designed by the GCMRC in consultation with the TWG to better understand its usefulness for sustaining fine sediment in the CRE. This experiment would not affect the annual water volume transferred between the two reservoirs as determined by other criteria.

References Cited:

¹ Lovich, S. and T.S. Melis, 2007, The state of the Colorado River ecosystem in Grand Canyon: Lessons from 10 years of adaptive ecosystem management. Intl. J. River Basin Management; v.5:3,

pp. 207-221.

² Schmidt, J.C., D.J. Topping, P.E. Grams, and J.E. Hazel, 2004, System-wide changes in the distribution of fine sediment in the Colorado River corridor between Glen Canyon Dam and Bright Angel Creek, Arizona. Final Report to Grand Canyon Monitoring and Research Center, Cooperative agreement 1425-98-FC-40-22640, 117 p.

³ United States Geological Survey, 2006, Assessment of the Estimated Effects of Four Experimental Options on Resources Below Glen Canyon Dam Draft Report dated Oct. 27, 2006; Attachment 10a, p. 5-6 at the following link: <http://www.usbr.gov/uc/rm/amp/twg/mtgs/06nov08/index.html>

⁴ Wright, S.A., J.C. Schmidt, T.S. Melis, D.J. Topping, and D.M. Rubin, 2008, Is there enough sand? Evaluating the fate of Grand Canyon sandbars. GSA Today, v.18:8, pp. 4–10.

GCDAMP Bureau of Reclamation Proposed Draft Budget for FY 2010-11

The FY 2009 Reclamation budget of \$2,389,160 would rise to \$2,610,844 in FY 2010 and \$2,674,920 in FY 2011 as proposed. Proposed changes from the FY 2009 budget, other than normal CPI changes, are as follows:

- 1) Unless otherwise stated, proposed changes are based on an estimated 3% CPI increase for FY 2010 and 2011. This estimate will be evaluated in ensuing months and, if the present nominal change in CPI persists, the estimate will be lowered to be in line with the anticipated end-of-year CPI.
- 2) POAHG Budget: Proposed new products in FY 2010-11 include science status updates, retractable banner display, tribal outreach materials, media kit folders, video B-roll kits, trade show participation, river guide resource materials, participation in media events (science day, news media tour, and endangered species translocation efforts), and educational materials. Proposed new fact sheets include: high flow test overview, monitoring of native fish, tribal values, non-native fish suppression, and fall steady flows.
- 3) Technical Work Group Chair Reimbursement: The TWG is proposing that these funds would be used for services of a facilitator in years when the TWG Chair does not charge the GCDAMP for services (see TWG discussion and recommendation below).
- 4) Compliance Documents: Unexpended funding for environmental and cultural compliance document preparation would be carried over and held to pay for anticipated larger scale compliance effort, most likely in 2012 (see TWG discussion and recommendation below).
- 5) Experimental Carryover Funds: This fund previously was not incremented by CPI. It is proposed to do so beginning in FY 2010 to keep pace with anticipated increased costs for major research efforts.
- 6) Mainstem Non-native Mechanical Removal: Funding for this activity was inserted into the Reclamation budget in response to a GCMRC proposal to spend these funds on other projects and to have this activity funded and carried out by a management agency as a “management action.” (see TWG discussion and recommendation below)
- 7) Non-native Fish Suppression Fund: This fund is proposed to be incremented by CPI and carried over from year to year for the purpose of ensuring that funding is available to respond to increases of problematic non-native fish, particularly those increases that are rapid and that escape early detection, in the Colorado River ecosystem. Establishing this fund would help prevent instability in the research and monitoring budget by preventing the need for in-year funding for responses to problematic non-native fish increases.
- 8) Canyon Treatment Plan and Implementation: The proposed budget is incremented by anticipated CPI in FY 2010 and 2011. Reclamation has agreed to withdraw this request under the presumption that the \$200,000 removed in FY 2008 will be replaced at the close of the five-year period covered by the treatment plan. No reallocation of funds has yet been proposed. If the CPI is not positive, no funds would be available for reallocation. (see TWG discussion and recommendation below)



United States Department of the Interior
U.S. GEOLOGICAL SURVEY
SOUTHWEST BIOLOGICAL SCIENCE CENTER
GRAND CANYON MONITORING AND RESEARCH CENTER
2255 NORTH GEMINI DRIVE, MS-9394
FLAGSTAFF, ARIZONA 86001
928 556-7094 Telephone
928 556-7092 Fax

March 25, 2009

MEMORANDUM

To: Glen Canyon Dam Adaptive Management Work Group

From: John Hamill, Chief, Grand Canyon Monitoring and Research Center, Southwest Biological Science Center, US Geological Survey, Flagstaff, Arizona

Subject: Preliminary Fiscal Year 2010-11 Glen Canyon Dam Adaptive Management Program Budget

Attached is the subject budget for your consideration. Major changes or revisions reflected in the preliminary FY 2010-11 budget proposal are summarized in Attachment 2. Our responses to the Technical Work Group concerns and recommendations related to the subject budget are attached for your consideration (Attachment 3).

GCMRC's Preliminary FY 2010-11 budget was developed based on:

- Guidance provided in the Monitoring and Research Plan (MRP) to Support the Glen Canyon Dam (GCD) Adaptive Management Program (AMP) which was approved by the Adaptive Management Work Group (AMWG) in August 2007, and
- Guidance provided in the March 2008 Environmental Assessment (EA) and related Conservation Measures included in the recent Fish and Wildlife Service Biological Opinion (BO) on the operation of GCD.
- Input from the Budget Ad Hoc Work Group in formulating this budget proposal.

The purpose of the preliminary budget is to identify the priorities for the FY 2010-11 work plan, including ongoing projects, discontinued projects, and new initiatives. The preliminary budget will provide the basis for the development of the FY 2010-11 biennial work plan. The proposed budget provides for the continued implementation of a number of ongoing projects included in the approved FY 2009 Work Plan and Budget, although funding for projects was adjusted to reflect cost of living increases, increased salary costs, logistical support, past performance, etc. The FY 2010 and 2011 provides increased emphasis on data analysis and reporting and moving several projects from R&D to Core Monitoring status.

To achieve a balanced budget a number of projects had to be scaled back to accommodate the increased funding being requested for several new or expanded projects and for other non-discretionary increases in costs for continuing projects. These adjustments are noted in the attached spreadsheet.

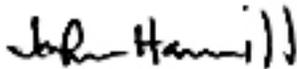
Review of AMWG Priorities, FY2010-11 Preliminary Budget, and Hydrograph, continued

The preliminary budget does not account for a potential High Flow Experiment in FY 2010–11. Currently, a HFE has not been authorized for FY 2010–11. Beginning in FY 2010, approximately \$450,000 should be available to support additional experimentation. GCMRC estimates the study costs for conducting the next HFE test at approximately \$500,000 to \$750,000.

Finally the preliminary budget assumed a 3 percent increase in funding based on the consumer price index (CPI). After consulting with the BAHG and TWG and based on current economic forecasts, GCMRC agreed to adjust the budget to assume a 0 percent CPI increase for FY 2010. This adjustment will be reflected in the FY 2010-11 work plan that is developed later this year.

After considering recommendations from the AMWG and DOI agencies, GCMRC, consistent with the established process, will develop detailed work plans for each of the projects that will be submitted to the Budget Ad Hoc Group, TWG, and AMWG for final review and consideration.

I look forward to discussing our proposed budget at the April 29-30, 2009, AMWG meeting.



JOHN HAMILL
Chief, GCMRC

Attachments (3)

cc Secretary's Designee

Attachment 1

FY2010 -11 GCDAMP budget for the USBR and the USGS GCMRC

Attached as the final page of this document.

Attachment 2

Highlights and major changes related to GCMRC's FY 2010-11 Preliminary Budget

Goal 2 Native Fishes

- Establishment of mainstem fish monitoring and LCR monitoring as a Core Monitoring Projects beginning in FY 2010 (BIO2.M1.10 and BIO2.M2.10, respectively). The scope and budget for these monitoring efforts will be determined based on the outcome of the PEP review planned for May 2009. For the purposes of the preliminary budget we assumed that funding levels for these efforts would continue at FY 2009 levels, adjusted for inflation.
- Transfer lead and funding responsibility for the nonnative fish control project (BIO2.R16.09) to an appropriate management agency beginning in FY 2010. GCMRC believes this is no longer a research or experimental activity, and as such, is more appropriately implemented by a management agency using funding from outside the AMP science budget. GCMRC will continue to design and oversee monitoring efforts for this action and possibly provide logistical support, if needed. Our primary concern is that funding major management or compliance actions will seriously erode the AMP science program over time.
- Establishing a new project in FY 2011 to provide science support for implementation of the Nonnative Fishes Management Plan that will be completed in FY 2010 (BIO2.R17.11).
- Providing GCMRC biology staff support associated with the Mainstem Fish Survival Project (BIO2.R9.10) to work with the Senior Scientist to develop more robust ecosystem models (PLAN12.P1.10).
- Beginning in FY 2010, direct funding from the nonnative control pilot testing project (BIO2.R.6.09) to the Mainstem Fish Monitoring project (BIO2.M4.10) to increase the ability to detect changes in abundance or distribution of nonnative fishes.

Goal 4. Rainbow Trout

- Establishment of Lees Ferry Trout monitoring as Core Monitoring Project beginning in FY 2010 (BIO4.M2.10). The scope and budget for the monitoring effort will be determined based on the outcome of the PEP review planned for May 2009. For the purpose of the preliminary budget, we assumed that funding levels for trout redds, larvae, and adults monitoring would continue at FY 2009 levels, adjusted for inflation.

Goal 6. Riparian/Springs

- Establishment of vegetation mapping and transects as a Core Monitoring Project beginning in FY 2010 (BIO6.M1.10 and BIO2.M2.11, respectively). Vegetation transects would be conducted every other year beginning in FY 2011.
- Establishment of a revived terrestrial habitat monitoring project (BIO6.R4.10) focused on arthropods (bugs). Terrestrial habitat monitoring would be conducted every other year beginning in FY 2010 (alternating with vegetation transects).

Highlights and major changes related to GCMRC's FY 2010-11 Preliminary Budget cont'd

Goal 8. Sediment

- Suspend channel and sandbar mapping in FY 2010 and focus on analysis and reporting of data collected in FY 2009 and before. Beginning in FY 2011, channel mapping will occur annually and measurements at the NAU sandbar study sites would occur every other year

Goal 9 Recreation

- Suspend sandbar and campground mapping field work in FY 2010 (REC9.R1.10) and focus on analysis and reporting of data collected in the past, and PEP review to determine the scope and direction of future monitoring
- Establish sand bar and campable area monitoring (REC9.M1.11) as a Core Monitoring Project beginning in FY 2011
- Include staff support for maintenance, updating and analysis of the information in the GIS Campsite Atlas (REC9.R3.10)
- Discontinue the project to compile and analyze existing safety data

Goal 11 Cultural

- Reduce the scope and budget of the archaeological site monitoring R&D project to eliminate NPS funding, and reduce survey and cooperater support in FY 2010 and 2011; assumes closer integration with NPS-funded monitoring efforts beginning in FY 2009. A final PEP review will be conducted in FY 2011 to determine the long term monitoring program

Goal 12. DASA

- Establishment of a new initiative (DASA12.D9.10) to coordinate/manage various image acquisitions, processing and change detection projects including vegetation mapping, Legacy Data Conversion, Goal 8 Channel Change, and sandbar and campable area mapping/change detection. Funding is derived from existing projects (Legacy data conversion, Integrated Analysis and Modeling)
- Establishment of a new initiative to synthesize the results of the 1996, 2004, and 2008 HFE using a portion of the Experimental Funds (DASA12.D10.10)
- Establishment of a new initiative to provide study design and statistical support for GCMRC science projects (DASA12.D8.10)

Attachment 3
GCMRC's Response to the Technical Work Group Issues of Concern
FY 2010-11 Preliminary Budget Recommendations to the Adaptive Management Work
Group
March 24, 2009

TWG MOTION: TWG has reviewed the preliminary FY 2010-11 biennial budget provided by GCMRC and BOR and is forwarding that budget to AMWG along with a list of concerns for AMWG consideration and feedback. This recommendation is based on the Budget Development Process approved by AMWG at their August 2004 meeting. The TWG will work with GCMRC and BOR to develop a final budget recommendation for FY 2010-11 and a proposed work plan over the summer; incorporating AMWG input on the “issues of concern”, further considerations based on the draft work plan (provided by GCMRC before June 8, 2009), and other considerations.

TWG recommends the annual operations hydrograph for FY 10 and 11 water years be MLFF with fall steady flows in September and October.

TWG recommends that the “Issues of Concern” be resolved and either incorporated into the budget or documented in writing why such is not appropriate. TWG requests either AMWG concurrence with the TWG recommendations on the “Issues of Concern” or further direction.

TWG Issues of Concern (followed by GCMRC response in **Bold**):

1. Line 24: Mainstem Nonnative Mechanical Removal. BOR has placed funding for this project in their portion of the FY 2010-11 budget in response to GCMRC removing this project from their proposed budget (see line 74). The TWG believes that since this activity was included in the conservation measures within the 2008 Biological Opinion that it must be funded and carried out in 2010 and 2011 and should be carried out by GCMRC.

Recommendation: TWG recommends that AMWG direct TWG to develop a final budget recommendation that moves the funding for “Mainstem Nonnative Mechanical Removal” back to line 74 under the GCMRC budget and that GCMRC add an additional removal trip. The resulting cost would be about \$300,000.

GCMRC Response: GCMRC has determined that cold water nonnative removal protocols have been well established. Thus, this is now an activity which should be conducted by an appropriate management agency (e.g., AZGFD, NPS) and funding for the effort should not come from the AMP science budget. GCMRC proposes to continue to support scientific components of the project (e.g., evaluating the humpback chub population response, estimating the size of the trout population in the control reach) but GCMRC believes that cold water nonnative fish removal should no longer be considered a scientific activity. As a general rule, once scientifically valid protocols have been developed, your science agency should move on to address priority research questions, not conduct routine management actions.

In spite of several attempts, the issue of transitioning from research to management (including determining appropriate funding strategies) has not been successfully addressed by the AMP. The issue has significant implications for the AMP in FY 2010 and 2011 and even larger implications in out-years. Some stakeholders are advocating for increased

**GCMRC's Response to the Technical Work Group Issues of Concern
FY 2010-11 Preliminary Budget Recommendations to the Adaptive Management Work
Group cont'd**

funding for mainstem nonnative control efforts and the archaeological site treatment program, both of which are compliance and/or management activities. What other compliance and management actions might be proposed in the future? Beach/Habitat Building Flows, tamarisk control, sediment augmentation, a TCD, warm water nonnative control, tributary nonnative control, hatchery development, restoration of extirpated species, HBC translocation— using the current power revenue budget to fund these and other potential activities is inconsistent with development and maintenance of a credible research and monitoring program as required by the GCPA. A broader and expanded funding base is needed that allows for implementation of management and compliance activities in a manner that does not jeopardize the AMP science program.

2. Goal 11 (NEW): GCMRC should develop a general proposal for a project that would develop a geomorphological model to evaluate dam effects on cultural sites.

Recommendation: TWG recommends that AMWG direct TWG and GCMRC to develop a general proposal incorporating technical information for a geomorphological model to evaluate dam effects on cultural sites.

GCMRC Response: The AMP has received several recommendations to develop a geomorphic model from previous independent review panels, the most recent recommendation coming from the panel that reviewed the NPS legacy monitoring data. The proposal to develop a geomorphic model is also identified in the Monitoring and Research Plan. GCMRC is encouraged that the CRAHG is now advocating for the development of a geomorphic model; we look forward to working with the group to define the specific purpose, scope, and objectives of a geomorphic model. We believe that within existing funding constraints, the primary focus in the FY 2010 and 2011 work plan should continue to be on pilot testing the archaeological site monitoring protocols, completing a PEP review, and developing a core monitoring proposal for TWG review.

3. Cultural program: Three proposals for additional projects were requested by the CRAHG with no specific funding source provided: (a) Line 114, add back in \$70k to the NPS, (b) NEW: Preservation Treatments, about \$36,450, and (c) NEW: Tribal 106 support of about \$60k. These projects are considered by the CRAHG to be important for the support and implementation of management actions/compliance under Section 106. These activities are described in the BOR treatment plan, but are currently not being fully carried out. CRAHG is concerned that this year's treatment plan is primarily an excavation/data recovery plan and that other important components of the treatment plan are not being implemented with the funding currently available. Further, it may be that the \$500k per year generally agreed to by AMWG for treatment of these sites may not be sufficient and further work at each of the treated sites is possible.

Recommendation: TWG recommends that AMWG direct TWG to work with the CRAHG, GCMRC, and BOR to determine the following before proposing a final budget:

- Provide an explanation of current funding line items (more explicit description of accounting) and how they relate to the treatment plan and necessary compliance, including lines: 23, 31, 114, and relevant portions of lines 39-43.

**GCMRC's Response to the Technical Work Group Issues of Concern
FY 2010-11 Preliminary Budget Recommendations to the Adaptive Management Work
Group, cont'd**

GCMRC Response: GCMRC will provide a more explicit description of work that will be conducted as part of the Cultural Resources Monitoring Research and Development Project in the FY 2010-11 Biennial work plan. This will include a breakout of funding by major project elements or tasks.

- Describe why the treatment plan cannot be fully implemented using the current line items described above, specifically the \$500k allocated in line 3 and ~ \$165k in line 23.

GCMRC Response: GCMRC has had limited involvement with the current treatment effort. We recommend completion of the Science Advisor's independent review of the treatment plan before additional funds are committed to the project. We also have concerns about expanded funding for this management and compliance activity with AMP funds—expansion of this project will impact the funding available for the science program.

- Discussions should occur between the NPS/GCMRC/BOR on the necessity of the \$70k for the NPS which was dropped this year from GCMRC's cultural budget (line 114). DOI agencies should discuss this and determine who is responsible for that funding and provide a response to the TWG by May 22. The TWG voted to recommend returning this funding to line 114 but it failed.

GCMRC Response: GCMRC will work with NPS to resolve this issue.

4. General comment on core monitoring: the budget assumes that we will have moved forward on core monitoring for a number of Goals under the AMP. Although this is reasonable to consider TWG believes it is premature. TWG will begin to consider the General Core Monitoring Plan this summer and from there will have a better idea what may constitute core monitoring. TWG should, within the core monitoring discussion, evaluate cost-effectiveness of current monitoring programs (precision, accuracy, cost trade-offs). GCMRC is planning a core monitoring workshop before the next TWG meeting to discuss the draft plan.

GCMRC Response: GCMRC does not believe this initial designation of several projects for Core Monitoring status pending TWG review and approval is premature; we are merely attempting to follow the agreed upon schedule and process identified in the Monitoring and Research Plan. As noted above, a TWG discussion of the General Core Monitoring Plan will occur this summer.

5. General comment on the work plan. TWG is looking for additional clarity in the work plan on staff funding including a current organizational chart. TWG requests the following: (a) that staff time for individual projects be allocated under those projects, (b) time be allocated in the work plan such that a substantial amount of time, about 20%, is allocated to writing reports and publications, and (c) any new staff additions or deletions be clearly outlined in the budget introduction and appropriate projects.

**GCMRC's Response to the Technical Work Group Issues of Concern
FY 2010-11 Preliminary Budget Recommendations to the Adaptive Management Work
Group, cont'd**

GCMRC Response: We will provide an updated organizational chart to the TWG and AMWG and identify any new permanent positions that will be established in FY 2010-11. The level of detail provided in the preliminary and final budget/work plan was discussed and agreed to by the TWG and GCMRC several years ago. The preliminary budget that is now being reviewed by the TWG and AMWG provides a summary of funding by project; more detail will be provided in the work plan that will be developed after the AMWG meets in April 2009. Providing information on how GCMRC staff time is allocated among projects is beyond the scope of what we intend to provide; this is unnecessary detail that will lead to inappropriate micro management by the TWG. With respect to suggestion b, timely data analysis and reporting is a major focus of the FY 2010-11 budget and work plan.

6. General comment on Goal 10. There is a lack of economic analysis capacity in the program to evaluate trade-offs or other economic concerns. Additional capacity should be considered. Unknown funding needs at this time.

GCMRC Response: The AMWG or DOI needs to determine whether additional economic analysis capacity is an AMP priority. It has been clearly identified as a priority by the Science Advisors and by previous NAS/NRC reviews of the program. However, it is currently not reflected in the AMWG priority questions or called for in the Monitoring and Research Plan.

7. Line 74: Priorities and funding under Goal 2. GCMRC should provide an explanation of where funding used in FY 2009 for Mainstem Non-native Mechanical Removal has been reallocated within the program.

GCMRC response: There are three primary budget items that received the money previously allocated for the mainstem removal project:

1. The salaries at FWS, AZGFD, and USGS are only going up each year. GCMRC typically receives requests for more funding for salaries from the cooperators each year and USGS salaries also increase.
2. Funding was provided for the remote PIT tag project in 2010 to provide for more equipment and the expertise to install it. This project has, to date, received broad support from the fish cooperators (primarily FWS, AZGFD, GCMRC, and BOR) because of its potential to reduce personnel costs in the future to get the same, or even more, data on the tagged fish (primarily HBC) that use the LCR.
3. Funding was provided for monitoring rainbow trout redds and larvae in the Lees Ferry reach. In FY 2008 this work was funded under the HFE, so additional funds needed to be provided for this activity from the annual budget in FY 2010 -11. These costs may be adjusted depending on the outcome of the May 2009 PEP review

8. General comment on accounting. Currently, BOR does not have adequate staff resources to track reports due by GCMRC from the work plan. Thus, there is inadequate tracking of deliverables

GCMRC's Response to the Technical Work Group Issues of Concern

FY 2010-11 Preliminary Budget Recommendations to the Adaptive Management Work Group, cont'd

by the AMP for projects funded by BOR funds. BOR should investigate options to provide staff resources in tracking reports.

GCMRC response: Since many of the deliverables are being developed by GCMRC, additional tracking and reporting on these deliverable will have staff implications for GCMRC as well as for BOR. GCMRC is willing to work with BOR on this need.

9. General comment on the budget process. AMWG approved a two-year rolling budget process at their August 2004 meeting. This is the first year that a two year budget has been attempted since that approval. In developing this budget, two options for a budget process were discussed. First, is the rolling budget approved by AMWG in 2004. Second, is a two-year budget that would only be modified slightly in year two, thus requiring much less effort in the second year. This could save valuable time and resources to work on other AMP concerns.

Recommendation: TWG recommends that AMWG direct TWG to develop a discussion paper on the pros and cons of the two budget approaches and respond back to AMWG at their August meeting with an initial review.

GCMRC Response: GCMRC supports this recommendation. Before approving the FY 2010-11 budget, a clear agreement should be developed on how the biennial budget process will work. GCMRC believes that the primary purpose of the biennial budget should be to streamline the AMP budget process, free up time for agencies and AMP to address other priority needs, and allow for better integration of AMP funding needs into agency budget process.

10. Goal 8: GCMRC should develop an on-the-shelf HFE science plan for a potential next HFE.

GCMRC Response: GCMRC will develop a general plan/strategy for future HFE testing later in 2009. While it is important to fully evaluate all of the learning that has come from the past three high flow experiments, it is clear that additional sand-enriched higher flows and continued long-term monitoring will be needed to answer the primary strategic science question – “Is there a flow only (using only the existing downstream sand supply) operating strategy for rebuilding and maintaining sandbars along the Colorado River below Glen Canyon Dam?” The GCMRC strongly suggests that the AMWG/DOI should consider and adopt a new, sediment supply criteria for determining when future high flows will be released from Glen Canyon Dam to utilize tributary sand inputs. Another important step is for the AMWG to develop and recommend to the Department of the Interior sandbar conditions below the dam that are needed/desired for achieving the goals of their 2003 Strategic Plan; making sure, on the basis of best available science information, that their recommended desired future conditions are both attainable and measurable. The crisis planning and compliance that have accompanied AMP/DOI deliberations of past HFEs have been very disruptive and needs to be avoided in the future. A structured approach and timeline are needed for evaluating the results of past HFEs and determining how to proceed from a science and management standpoint.

**GCMRC's Response to the Technical Work Group Issues of Concern
FY 2010-11 Preliminary Budget Recommendations to the Adaptive Management Work
Group, cont'd**

11. TWG understands that GCMRC will provide historical expenditures by project (going back 3 years) in the work plan.

GCMRC Response: GCMRC will attempt to comply with this request by the next TWG meeting.

12. Goal 2 (line 67): AMWG should be aware that the implementation of the warm-water non-native control plan efforts in 2011 may have budget implications (moving from the testing phase to non-native control implementation).

GCMRC Response: This is a potentially expensive undertaking that could seriously impact the AMP science program in future years. AMWG should consider how this and other management/compliance programs will be funded and implemented in the future.

13. Goal 2: GCMRC should investigate research into determining the natal origins of trout in the LCR reach of the mainstem. This investigation should consider the feasibility of whether to specifically target juvenile fish which aren't currently being tagged.

GCMRC Response: GCMRC made a presentation on this topic to the TWG at their October 2008 meeting. The conclusion of this presentation is that all available data suggest that the majority, but not all, of the rainbow trout found downstream of Lees Ferry are spawned between Glen Canyon Dam and Lees Ferry. Some TWG members recommended additional research to increase the certainty of this conclusion. GCMRC agreed to initiate a literature review to bring together available information on this topic. GCMRC also intends to review this topic with the protocol evaluation panel in May 2009, especially to request recommendations on research directions and monitoring that might help determine the natal origin of rainbow trout in Grand Canyon with greater certainty.

14. Budget general. GCMRC should disclose the total "burden" for each budget line item, the amount of carry-over for each budget line item, and that a crosswalk be provided from the 2009 budget to the 2010 and 2011 budget so that changes in the budget/work plan for each item can be understood.

GCMRC Response: USGS appropriated funding (\$1M) is being used to reduce the burden rate assessed by USGS on AMP projects. Providing detailed project by project accounting on how USGS cost share funds are allocated among projects is beyond the scope of what we intend to provide; this unnecessary detail will not improve the TWG's technical review of the budget or work plan.

15. The AMWG should evaluate the prioritization of program areas (to satisfy compliance concerns).

GCMRC Response: GCMRC believes the AMP should periodically revisit its priorities in the context of a review and revision of its Strategic Plan. We would recommend that this be done to inform the revision of the SSP and MRP that is planned for 2011.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1				ID	Project Descriptions	Approved BOR FY09 Budget (incl 4.9% CPI increase)	BOR Estimated FY10 Budget (3% CPI over FY09)	BOR Estimated FY11 Budget (3% CPI over FY10)						
2	Reclamation Administration Power Revenue Under Cap Funded Projects													
3	A Adaptive Management Work Group													
4	1				Personnel Costs	176,747	182,049	187,511						
5	2				AMWG Member Travel Reimbursement	17,467	17,991	18,531						
6	3				Reclamation Travel	14,439	14,873	15,319						
7	4				Facilitation Contract	26,959	27,768	28,601						
8	5				POAHG Expenses	55,536	57,202	58,918						
9	6				Other	7,969	8,208	8,455						
10	Reclamation AMWG Subtotal					299,118	308,091	317,334						
11	B Technical Work Group													
12	1				Personnel Costs	86,195	88,780	91,444						
13	2				TWG Member Travel Reimbursement	23,952	24,670	25,410						
14	3				Reclamation Travel	17,658	18,188	18,734						
15	4				TWG Chair Reimbursement	24,625	25,363	26,124						
16	5				Other	2,277	2,345	2,416						
17	Reclamation TWG Subtotal					154,706	159,347	164,128						
18	C Other													
19	1				Compliance Documents	50,000	51,500	53,045						
20	2				Administrative Support for NPS Permitting	118,852	122,417	126,090						
21	3				Contract Administration	39,953	41,152	42,386						
22	4				Experimental Carryover Funds - to be held by BOR	500,000	515,000	530,450						
23	5				Integrated Tribal Resources Monitoring	142,884	147,171	151,586						
24	6				Mainstem Non-native Mechanical Removal	0	164,259	169,187	\$141,963 is the FY09 budgeted amount; \$18,037 added to FY10 from line 73 (for nearshore ecology) and incremented by CPI for FY11; nearshore ecology will now be funded from USBR appropriated funds. (see BIO 2.R15.10 Line 155)					
25	7				Non-native Fish Suppression Contingency Fund	48,483	49,937	51,436	The total recommended amount is \$103,658 of which \$48,483 is underfunded FY09 and 55,175 is FY08 carryover.					
26	Other Subtotal					900,172	1,091,436	1,124,179						
27	Reclamation Administrative Subtotal					1,353,996	1,558,875	1,605,641						
28	D Programmatic Agreement Cultural Resources													
29	1				Reclamation Administration	60,164	61,969	63,828						
30	2				NPS Personnel Support for Archaeological Program	-	-	-	Combined with the Canyon Treatment Plan with line #3					
31	3				Canyon Treatment Plan and Implementation	500,000	515,000	530,450	Includes \$70,000 for NPS Support					
32	Programmatic Agreement Subtotal					560,164	576,969	594,278						
33	Reclamation Power Revenue Under Cap Program Subtotal:					1,914,160	2,135,844	2,199,920						
34														

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
35					Reclamation Appropriated Funded Projects									
36	HCA				Development of a LCR Management Plan	-	-	-						
37					Tribal Consultation									
38	A				Cooperative Agreements with Tribes									
39	1	Hopi Tribe				95,000	95,000	95,000						
40	2	Hualapai Tribe				95,000	95,000	95,000						
41	3	Navajo Nation				95,000	95,000	95,000						
42	4	Pueblo of Zuni				95,000	95,000	95,000						
43	5	Southern Paiute				95,000	95,000	95,000						
44	6	DOI Handling Fee				-	-	-						
45					Tribal Consultation Subtotal	475,000	475,000	475,000						
46					Reclamation Appropriated Projects Subtotal:	475,000	475,000	475,000						
47														
48					BUREAU OF RECLAMATION TOTAL AMP PROGRAM COSTS:	2,389,160	2,610,844	2,674,920						

	GCMRC Project ID	FY10 Status	FY11 Status	Funding Emphasis	Project Descriptions	FY09 Approved Budget (incl 4.9% CPI Increase)	FY10 Estimated Budget (w/ 3% CPI Increase over FY09)	FY11 Estimated Budget (w/ 3% CPI Increase over FY10)	Comments
50									
51	U.S. Geological Survey - Biological Resource Division - GCMRC - Power Revenues Under Cap Funded Projects								
52	1.03								
53	GOAL 1 - FOOD BASE								
54	BIO 1.R1.10	O	C	CRD	Aquatic Food Base (FY05--FY10)	510,626	498,894	-	FY10: All tech reports finalized & reported to TWG by Sept '10, One trip for data collection planned in FY10
55	BIO 1.M1.11	N	O	CRD	Aquatic Food Base (FY11--Ongoing)	-	-	249,192	One trip for data collection planned in FY11. FY11: PEP Review and implementation as a Core Monitoring Project.
56	BIO 1.R4.10	O	C	CRD	Impacts of Various Flow Regimes on the Aquatic Food Base (FY08--FY10)	85,472	62,111	-	FY10: Final Report will be part of BIO 1.R1.10 FY11: Any future work will be Integrated with Aquatic Food Base (BIO 1.M1.10)
57	SUB-TOTAL GOAL 1					596,098	561,005	249,192	

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	GCMRC Project ID	FY10 Status	FY11 Status	Funding Emphasis	Project Descriptions	FY09 Approved Budget (incl 4.9% CPI Increase)	FY10 Estimated Budget (w/ 3% CPI Increase over FY09)	FY11 Estimated Budget (w/ 3% CPI Increase over FY10)	Comments					
50														
51	U.S. Geological Survey - Biological Resource Division - GCMRC - Power Revenues Under Cap Funded Projects													
58	GOAL 2 - NATIVE FISHES													
59	BIO 2.R1.09	C	C	CRD	LCR HBC Monitoring Lower 15km (HBC Population Est) (FY09)	487,666	-	-	BOCM; FY10 / FY11 Moved to Core Monitoring (BIO 2.M1.10)					
60	BIO 2.R2.09	C	C	CRD	LCR HBC Monitoring Lower 1,200m (FY09)	61,635	-	-	BOCM; FY10 / FY11 Moved to Core Monitoring (BIO 2.M1.10)					
61	BIO 2.R3.09	C	C	CRD	HBC Monitoring Above Chute Falls (FY09)	136,490	-	-	BOCM; FY10 / FY11 Moved to Core Monitoring (BIO 2.M1.10)					
62	BIO 2.M1.10	N	O		LCR Fish Monitoring (FY10--Ongoing)	-	672,695	688,613	Funding & scope of project subject to revision based on the outcome of the FY09 PEP; Assumes approval as a Core Monitoring Project beginning in FY10					
63	BIO 2.R4.09	C	C	ORD	Monitoring Mainstem Fishes (incl Diamond Down) (FY09)	474,723	-	-	BOCM; FY10 / FY11 Moved to Core Monitoring (BIO 2.M4.10)					
64	BIO 2.M4.10	N	O	ORD	Monitoring Mainstem Fishes (FY10--Ongoing)	-	608,888	641,029	BOCM; Funding & scope of project subject to revision based on the outcome of the FY09 PEP; Assumes approval as a Core Monitoring Project beginning in FY10; Includes funding for expanded nonnative fish sampling					
65	BIO 2.R5.10	O	C	ORD	Nonnative Control Planning (FY06--FY10)	63,640	78,058	-	BOCM Longterm Nonnative Fish Management Plan to be delivered by Sept 2010 for Management consideration					
66	BIO 2.R17.11		N	ORD	Nonnative Control Plan Science Support (FY11--FY13)	-	-	138,599	BOCM Provide science support for implementation for the Nonnative Fish Control Plan					
67	BIO 2.R6.09	C	C	ORD	Nonnative Control Pilot Testing (FY06--FY09)	110,281	-	-	BOCM Funding moved to Monitoring Mainstem Fishes (BIO 2.M4.10) beginning in FY10					
68	BIO 2.R7.10	O	O	CRD	Stock Assessment of Native Fish in Grand Canyon (FY07--Ongoing)	54,619	93,260	97,619	BOCM Humpback Chub ASMR update & refinement					
69	BIO 2.R9.10	O	O	CRD	Mainstem Fish Survival (FY07--FY11)	96,013.00	-	-	BOCM FY10: Integrated with System Ecologist (PLAN 12.P1.10) & Near Shore Ecology (BIO 2.R15.10) projects					
70	BIO 2.R10.09	C	C	ORD	Backwater Seining	-	-	-	Will be addressed in Near Shore Ecology (BIO 2.15.10) project and evaluated in the FY09 PEP					
71	BIO 2.R11.09	C	C	CRD	Native Fishes Habitat Data Analysis (FY07--FY09)	-	-	-	Report completed FY09; FY10: Integrated in to Near Shore Ecology (BIO 2.15.10) project					
72	BIO 2.R13.10	O	O	CRD	Remote PIT Tag Reading (FY07--FY11)	107,319	131,050	134,577	Could potentially reduce costs of LCR Monitoring (BIO 2.M1.10) project					
73	BIO 2.R15.10	O	O	CRD	Near Shore Ecology / Fall Steady Flows (FY08--Ongoing)	11,970	-	-	BOCM Funded entirely with BOR appropriated funds in FY10 & FY11 (see BIO 2.R15.10 Line 155)					
74	BIO 2.R16.09	C	C	CRD	Mainstem Nonnative Fish Control (FY09)	141,023	-	-	BOCM FY10: Move to Management Action and to appropriate Management Agency, to be determined; monitoring associated with nonnative removal will be designed by and coordinated through GCMRC					
75	SUB-TOTAL GOAL 2					1,745,379	1,583,951	1,700,437						
76	GOAL 3 - EXTIRPATED SPECIES													
77	07.3.00	-	-	NA	None Identified	-	-	-						
78	SUB-TOTAL GOAL 3					-	-	-						
79	GOAL 4 - RAINBOW TROUT													
80	BIO 4.M1.09	C	C	COR	Monitoring Lees Ferry Trout (Ongoing)	118,454	-	-	BOCM; Moved to Core Monitoring (BIO 4.M2.10) beginning FY10					
81	BIO 4.E1.09	C	C	LTE	Monitoring Rainbow Trout Redds & Larvae (FY07--FY09)	-	-	-	Work conducted under HFE Science Plan in FY 08 and 09 (125k net); Moved to Core Monitoring (BIO 4.M2.10) beginning FY10					
82	BIO 4.M2.10	N	O		Monitoring Lees Ferry Rainbow Trout Redds, Larvae & Adults (FY10--Ongoing)	-	226,668	237,396	Funding and scope subject to revision based on FY09 PEP; Assumes approval as a Core Monitoring Project beginning in FY10					
83	SUB-TOTAL GOAL 4					118,454	226,668	237,396						

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	GCMRC Project ID	FY10 Status	FY11 Status	Funding Emphasis	Project Descriptions	FY09 Approved Budget (incl 4.9% CPI Increase)	FY10 Estimated Budget (w/ 3% CPI Increase over FY09)	FY11 Estimated Budget (w/ 3% CPI Increase over FY10)	Comments					
50														
51	U.S. Geological Survey - Biological Resource Division - GCMRC - Power Revenues Under Cap Funded Projects													
84	GOAL 5 - KANAB AMBERSNAIL													
85	BIO 5.R1.10	O	O	CRD	Monitor Kanab Ambersnail (FY07--FY11)	22,883	25,974	31,750	BOCM Funding and scope subject to USFWS status review & future PEP					
86	SUB-TOTAL GOAL 5					22,883	25,974	31,750						
87	GOAL 6 - SPRINGS / RIPARIAN													
88	BIO 6.R1.09	C	C	CRD	Vegetation Mapping (FY07--FY09)	121,804	-	-	Final core monitoring report will be completed FY09					
89	BIO 6.M1.10	N	O	CRD	Vegetation Mapping (FY10--Ongoing)	-	77,623	98,081	Will be implemented as component of Integrated Image Analysis and Change Detection (DASA 12.9.10); Assumes approval as a Core Monitoring Project beginning in FY10					
90	BIO 6.R2.11	C	C	COR	Vegetation Transects (FY07--FY09)	52,502	-	-	Final core monitoring report will be completed FY09					
91	BIO 6.M2.11	N	O	COR	Vegetation Transects (FY10--Ongoing)	-	-	156,613	Assumes approval as a Core Monitoring Project beginning in FY10; Transects monitoring will be implemented in alternating years					
92	BIO 6.R4.10	N	O		Terrestrial Habitat Monitoring R & D (FY10--FY12)	-	116,881	-	FY10: Sampling for arthropods; Will be implemented as a research project in alternating years (FY10 & FY12)					
93	BIO 6.R3.10	O	C	CRD	Vegetation Synthesis (FY07--FY10)	60,364	37,598	-	Final report will be completed in FY10					
94	SUB-TOTAL GOAL 6					234,670	232,102	254,694						
95	GOAL 7 - QUALITY-OF-WATER													
96	BIO 7.R1.10	O	O	CRD	Water Quality Monitoring Lake - Powell & Tailwaters (BUDGET PRESENTED BELOW) (Ongoing)	-	-	-	Funded under separate agreement, refer to Power Revenue Funded NOT Capped table below					
97	PHY 7.M1.10	O	O	COR	Integrated Quality-of-Water Monitoring (Downstream of GCD) (FY07--Ongoing)	931,513	979,080	1,010,329	This represents 1 of the 4 longterm core monitoring protocols for sediment; Data collection FY10 & FY11 will be same as FY09; assumes continued funding of Diamond Creek gage by Southern Nevada Water Authority					
98	PHY 7.R2.10	O	C	CRD	Integrated Flow, Sediment Transport and Temperature Modeling of the CRE (FY09--FY10)	127,134	245,599	-	FY09 budget increased by \$173,269 carry over from prior years (not reflected in FY09 budget at left) for a total of \$300,403 budgeted in FY09. Report containing results & recommendations for future model development will be completed in FY10					
99	PHY 7.R3.11		N	CRD	Modeling Support & Temperature Models (FY11--Ongoing)	-	-	126,866	Staff for ongoing model support and updating; Does not include cooperater involvement					
100	SUB-TOTAL GOAL 7					1,058,647	1,224,679	1,137,195						
101	GOAL 8 - SEDIMENT													
102	PHY 8.M2.10	O	O	COR	Integrated Longterm Monitoring of System Wide Changes in Sediment Storage (FY09--Ongoing)	309,224	220,000	470,434	Analysis of Overflight imagery will be implemented as component of Integrated Image Analysis and Change Detection 1(DASA 2.D9.10); Channel mapping or sandbar data collection suspended in FY10; Focus on data analysis & reporting; Resume data collection FY11					
103	SUB-TOTAL GOAL 8					309,224	220,000	470,434						
104	GOAL 9 - RECREATIONAL EXPERIENCE													
105	REC 9.R1.10	C		CRD	Sand Bar and Campable Area Monitoring R & D (FY01--FY10)	55,075	56,900	-	Fieldwork suspended in FY10; Focus on analysis & reporting and PEP review					
106	REC 9.M1.11		N	CRD	Sand Bar and Campable Area Monitoring (FY11--Ongoing)	-	-	78,142	Assumes approval as a Core Monitoring Project beginning in FY11; Budget and scope of project subject to revision by outcome of FY10 PEP					
107	REC 9.R3.10	O	O	CRD	Compile Campsite Inventory and GIS Atlas (FY07--Ongoing)	-	56,870	60,734	Website maintenance & updating (ongoing) and analysis of campsite data FY10 & FY11 only					
108	REC 9.R4.10	C	C	CRD	Compile and Analyze Existing Safety Data (FY09--FY10)	26,296	-	-	Project terminated in FY10; Final report will be completed in FY10					
109	SUB-TOTAL GOAL 9					81,371	113,770	138,876						

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	GCMRC Project ID	FY10 Status	FY11 Status	Funding Emphasis	Project Descriptions	FY09 Approved Budget (incl 4.9% CPI Increase)	FY10 Estimated Budget (w/ 3% CPI Increase over FY09)	FY11 Estimated Budget (w/ 3% CPI Increase over FY10)	Comments					
50														
51	U.S. Geological Survey - Biological Resource Division - GCMRC - Power Revenues Under Cap Funded Projects													
110	GOAL 10 - HYDROPOWER													
111	HYD 10.M1.10	O	O	CRD	Monitor Power Generation and Market Values under Current and Future Dam Operations (FY07--Ongoing)	19,587	9,680	10,104	Annual report and website maintenance					
112	SUB-TOTAL GOAL 10					19,587	9,680	10,104						
113	GOAL 11 - CULTURAL													
114	CUL 11.R1.10	O	C	CRD	Research & Development toward Core Monitoring (FY06--FY11)	448,088	354,887	370,684	Eliminates NPS funding, survey support, and reduced cooperater support in FY10; Assumes closer integration with NPS monitoring efforts beginning in FY09 and FY10; PEP review in FY11 to determine long term monitoring program					
115	CUL 11.R2.09	N	N	CRD	Implement Tribal Monitoring Projects (See funding in BOR section)	-	-	-	See funding in BOR section. Line 23.					
116	SUB-TOTAL GOAL 11					448,088	354,887	370,684						
117	GOAL 12 - HIGH QUALITY MONITORING, RESEARCH & AEAM													
118	DASA 12.M1.10	O	O	CRD	Quadrennial Remote Sensing Overflight Working Capital Fund) (FY08--Ongoing)	202,340	206,100	207,586	Acquisition, processing, analysis & reporting for the next planned Overflight in 2013					
119	DASA 12.D9.10	N	O		Integrated Image Analysis and Change Detection (FY10--Ongoing)	-	242,798	248,237	Coordination / oversight of various image acquisition and processing & change detection projects including Vegetation Mapping (BIO 6.M1.10), Legacy Data Conversion (DASA 12.D3.10), Integrated Anaylsis & Modelling (DASA 12.D7.10), Goal 8 Channel Change (PHY 8.M2.10), Sandbar & Campable Area Mapping (REC 9.R1.10, REC 9.M1.11)					
120	DASA 12.D10.10	N	C		HFE Synthesis Report (All Resources) (FY10)	-	-	-	Approx 100k to be funded by Experimental Fund - See BOR Budget					
121	DASA 12.D2.10	O	O	APM	Grand Canyon Integrated Oracle Database Management System (FY07--Ongoing)	184,485	171,947	179,408						
122	DASA 12.D8.10	O	O	APM	Biometrics & General Analysis Support (FY09--Ongoing)	-	170,874	179,243	New position established through staff reorganization in FY09 (Lew Coggins)					
123	DASA 12.D3.10	O	O	APM	Library Operations (FY08--Ongoing)	56,284	62,524	81,111						
124	DASA 12.D4.10	O	C	APM	Legacy Analog Data Conversion (Analog to Digital - Reports & Imagery) (FY08--FY10)	130,739	20,188	-	Moved project & related funding to Integrated Image Analysis & Change Detection (DASA 12.D9.10)					
125	DASA 12.D5.10	O	O	APM	GIS Support for Integrated Analyses and Projects (FY07--Ongoing)	332,871	362,614	373,796						
126	DASA 12.D7.10	C	C	CRD	Integrated Analysis and Modeling - FY09 Overflights	129,124	-	-	Moved project & related funding to Integrated Image Analysis & Change Detection (DASA 12.9.10)					
127	<i>Sub-total Goal 12 DASA Portion</i>					<i>1,035,843</i>	<i>1,237,045</i>	<i>1,269,381</i>						
128	SUP 12.S1.10	O	O	APM	Logistics Base Costs (See BNELA for project related logistics costs) (Ongoing)	180,531	155,603	195,476						
129	SUP 12.S2.10	O	O	APM	Survey Operations (Ongoing)	114,718	61,126	64,183	Includes deposit in a WCF for survey equipment replacement FY11					
130	SUP 12.S3.10	O	O	APM	Control Network (Ongoing)	91,104	134,216	172,196						
131	Sub-total Goal 12 Support Portion					386,353	350,945	431,855						
132	PLAN 12.P1.10	O	C	CRD	Identify Critical Ecosystem Interactions and Data Gap (FY08--FY10)	50,585	167,259	119,399	Continued support for review, revision and upgrade of Ecosystem Models in collaboration with Senior Ecologist; Includes additional support from GCMRC Biologists					
133	PLAN 12.P3.10	O	C	ORD	Low Steady Summer Flows - Data and Research Compilation, Synopsis and Synthesis	29,251	16,792	-	Report finalization and publication in FY10					
134	<i>Sub-total Goal 12 Planning Portion</i>					<i>79,836</i>	<i>184,051</i>	<i>119,399</i>						

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	GCMRC Project ID	FY10 Status	FY11 Status	Funding Emphasis	Project Descriptions	FY09 Approved Budget (incl 4.9% CPI Increase)	FY10 Estimated Budget (w/ 3% CPI Increase over FY09)	FY11 Estimated Budget (w/ 3% CPI Increase over FY10)	Comments					
50														
51	U.S. Geological Survey - Biological Resource Division - GCMRC - Power Revenues Under Cap Funded Projects													
135	ADM 12.A1.10 (A)	O	O	APM	Administrative Operations (Ongoing)	173,812	161,489	164,429	Travel, telephones, supplies, furniture & staff awards not specific to projects					
136	ADM 12.A1.10 (B)	O	O	APM	Administrative Operations - GSA Vehicle Costs (Ongoing)	50,950	63,525	66,701	GSA Vehicle Fleet - These costs have historically been held in Adminstarative Operations. In FY09 they were broken out in order to better track them					
137	ADM 12.A1.10 (C)	O	O	APM	Administrative Operations - Interior Vehicle Costs (Ongoing)	25,475	31,763	33,351	Interior Vehicle Fleet - These costs have historically been held in Adminstarative Operations. In FY09 they were broken out in order to better track them					
138	ADM 12.A2.10	O	O	APM	Program Planning & Management (Ongoing)	1,111,596	1,170,361	1,231,630	GCMRC Program Management staff, travel, & supplies					
139	ADM 12.A3.10	O	O	APM	AMWG/TWG Meeting Travel Funds (Ongoing)	19,154	19,501	20,085						
140	ADM 12.A4.10	O	O	APM	Independent Reviews (Ongoing)	21,423	19,647	22,465	PEPs and other non-SA peer reviews					
141	ADM 12.A4.10	O	O	APM	Executive Director of Science Advisors Review and Coordination; includes Science Advisors' Expenses (Ongoing)	214,227	180,250	224,646						
142	ADM 12.A6.10		O	APM	2011 Colorado River Basin Science and Management Symposium (FY11--Ongoing)	-	-	25,000	Total estimated cost: \$200,000. Assumes contributions from various Colorado River Recovery programs and other agencies.					
143	ADM 12.A5.10	O	O	APM	GCMRC Component of SBSC Sys Admin Support (FY05--Ongoing)	214,350	217,113	224,775	FY10 incr for 1/4 time position for website maintenance					
144	<i>Sub-total Goal 12 Administrative/Management Portion</i>					1,830,987	1,863,649	2,013,082						
145	SUB-TOTAL GOAL 12					3,333,019	3,635,690	3,833,717						
146	GCMRC Power Revenues Under Cap Projects Sub-totals					7,967,420	8,188,406	8,434,478						
147														
148														
149	GCMRC Power Revenue Funded Projects (NOT Capped) and Other Funded Projects													
150	BIO 7.R1.10	O	O	CRD	Water Quality Monitoring - Lake Powell & Tailwaters (FY07--FY11)	257,137	249,347	261,874	Refer to BIO 7.R1.10 Line 95					
151	GCMRC Other Power Revenue Agreements Projects Subtotals:					257,137	249,347	261,874						
152														
153	GCMRC Other Agreement Funding													
154	BIO 2.R15.10	N	N	CRD	Near Shore Ecology / Fall Steady Flows (FY08--FY12)	500,000	552,047	556,095	BOCM					
155	GCMRC Other Agreement Funding Projects Subtotals					500,000	552,047	556,095						
156	GCMRC ALL Other Agreements Projects TOTALS					757,137	801,394	817,969						
157														
158	GCMRC TOTAL AMP PLANNED PROGRAM COSTS					8,724,557	8,989,800	9,252,447						
159														

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	GCMRC Project ID	FY10 Status	FY11 Status	Funding Emphasis	Project Descriptions	FY09 Approved Budget (incl 4.9% CPI Increase)	FY10 Estimated Budget (w/ 3% CPI Increase over FY09)	FY11 Estimated Budget (w/ 3% CPI Increase over FY10)	Comments					
50														
51	U.S. Geological Survey - Biological Resource Division - GCMRC - Power Revenues Under Cap Funded Projects													
160	PROGRAM COSTS:	BOR Power Revenues Under Cap Program Costs:				FISCAL YEAR 2009	FISCAL YEAR 2010	FISCAL YEAR 2011						
161		BOR Power Revenues Under Cap Program Costs (gross)				1,914,160	2,135,844	2,199,920						
162		GCMRC Power Revenues Under Cap Program Costs (gross)				7,967,420	8,188,406	8,434,478						
163		Subtotal BOR & GCMRC Power Revenue Under Cap Program Costs				9,881,580	10,324,250	10,634,398						
164														
165	PROGRAM FUNDING:	BOR Power Revenues Under Cap Program Funding:				FISCAL YEAR 2009	FISCAL YEAR 2010	FISCAL YEAR 2011						
166		BOR Power Revenues Under Cap (gross)				1,914,160	1,989,621	2,049,310	FY10 includes \$18,037 of power revenues which was for nearshore ecology which is being replaced by \$18,037 USBR appropriated funds.					
167		GCMRC Power Revenues Under Cap (gross)				7,967,420	8,188,406	8,434,478						
168		Subtotal BOR & GCMRC Power Revenue Under Cap:				9,881,580	10,178,027	10,483,788	FY09 should be 9,881,580 but you have a combined budget which is 99,789 above					
169	DIFFERENCE BETWEEN ESTIMATED COSTS AND ESTIMATED INCOME FOR FY09 POWER REVENUES UNDER CAP:				(0)	(146,223)	(150,610)							
170														
171	PROGRAM COSTS:	BOR Appropriated and Other Program Costs :				FISCAL YEAR 2009	FISCAL YEAR 2010	FISCAL YEAR 2011						
172		BOR Appropriated and Other Program Costs (gross)				475,000	475,000	475,000						
173		GCMRC Appropriated and Other Program Costs (gross)				757,137	801,394	817,969						
174		Subtotal BOR & GCMRC Power Revenue (Non-Capped) and Other				1,232,137	1,276,394	1,292,969						
175														
176	PROGRAM FUNDING:	BOR Appropriated and Other Program Funding:				FISCAL YEAR 2009	FISCAL YEAR 2010	FISCAL YEAR 2011						
177		BOR Appropriated and Other Program Costs (gross)				475,000	475,000	475,000						
178		GCMRC Appropriated and Other Program Costs (gross)				757,137	801,394	817,969						
179		Subtotal BOR & GCMRC Power Revenue (Non-Capped) and Other				1,232,137	1,276,394	1,292,969						
180														
181	DIFFERENCE BETWEEN ESTIMATED COSTS AND ESTIMATED INCOME FOR POWER REVENUES UNDER CAP:													
182														

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	GCMRC Project ID	FY10 Status	FY11 Status	Funding Emphasis	Project Descriptions	FY09 Approved Budget (incl 4.9% CPI Increase)	FY10 Estimated Budget (w/ 3% CPI Increase over FY09)	FY11 Estimated Budget (w/ 3% CPI Increase over FY10)	Comments					
50														
51	U.S. Geological Survey - Biological Resource Division - GCMRC - Power Revenues Under Cap Funded Projects													
183	GCMRC HIGH FLOW EXPERIMENT FUNDING FY2009													
184	Various	NA	NA	EXP	Glen Canyon Dam Adaptive Management Program Experimental Funds (New funding in FY09); Agreement No. 06-AA-40-2439	500,000	-	-						
185	GCMRC High Flow Experiment Funding Projects Subtotals					500,000	-	-						
186														
187	Explanation of information found in columns A through H of Draft Budget for GCMRC GCDAMP													
188	Column													
189	GCMRC Project ID Program Areas	A	1-3	ADM: Administration BIO: Biology CUL: Cultural DASA: Data Acquisition, Storage and Analysis HYD: Hydropower PHY: Physical Science PLA: Planning REC: Recreation SUP: Support										
190			4-5	GCDAMP Goal Number										
191			6-7	Project Number within GCMRC Annual Work Plan A: Admin D: DASA M: Monitoring P: Planning R: Research S: Support										
192			7-8	Fiscal Year of Proposed Budget / First Year in Biennial Work Plan										
193														
194	Column	B	FY10 Project Status C: Complete N: New O: Ongoing											
195	Status													
196	Column	C	FY11 Project Status C: Complete N: New O: Ongoing											
197	Status													
198	Column	D	APM: Admin & Program Mgmt COR: Core Monitoring CRD: Core Monitoring Research & Development LTE: Longterm Experiment NA: Not Applicable ORD: Ongoing Research and Development											
199	Category													
200	Column	E	Project Title (Beginning Fiscal Year Start Date--End Fiscal Year Date)											
201	Project Description													
202	Column	F	FY 2009 GCDAMP Approved Budget											
203	FY 2008 Approved Budget													
204	Column	G	FY 2010 GCDAMP Estimated Draft Budget Proposal											
205	FY 2009 Estimated Draft Budget													
206	Column	H	FY 2011 GCDAMP Estimated Draft Budget Proposal											
207	FY 2009 Estimated Draft Budget													
208	Column	G	Comments; BOCM represents Biological Opinion Core Monitoring Items											
209	Comments													
210														
211														