APPENDIX Q:

RESPONSES TO PUBLIC COMMENTS ON THE GLEN CANYON DAM LONG-TERM EXPERIMENTAL AND MANAGEMENT PLAN DRAFT ENVIRONMENTAL IMPACT STATEMENT

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The U.S. Department of the Interior (DOI), through the Bureau of Reclamation (Reclamation) and National Park Service (NPS), proposes to develop and implement a Long-Term Experimental and Management Plan (LTEMP) for operations of Glen Canyon Dam. The LTEMP would provide a framework for adaptively managing Glen Canyon Dam operations over the next 20 years, consistent with the Grand Canyon Protection Act of 1992 (GCPA) and other provisions of applicable federal law. The LTEMP would determine specific options for dam operations, non-flow actions, and appropriate experimental and management actions that will meet the GCPA's requirements and minimize impacts on resources within the area impacted by dam operations, including those of importance to American Indian Tribes.

On January 8, 2016, the LTEMP DEIS was filed with Region 9 of the U.S. Environmental Protection Agency (EPA); a Notice of Availability and Notice of Public Meetings were published in the *Federal Register* (81 FR 963); and an email notification of the availability of the DEIS for download from the project website (www.ltempeis.gov) was sent to approximately 600 members of the public who had signed up for notification during the scoping period. Prior to this date, the DEIS was sent to each of the Governors, Senators, and Representatives from relevant congressional districts of the seven Colorado River Basin States (Arizona, California, Colorado, Utah, Nevada, New Mexico, and Wyoming).

In addition to making the DEIS available on the public website, 84 compact disc copies of the DEIS were mailed to individuals at their request; 46 copies were picked up at public meetings held for the DEIS; and copies were made available for public review after the DEIS was published at the following locations:

- J. Willard Marriott Library, University of Utah, 295 South 1500 East, Salt Lake City, Utah 84112.
- Cline Library, Northern Arizona University, 1001 S. Knoles Drive, Flagstaff, Arizona 86011-6022.
- Burton Barr Central Library, 1221 North Central Avenue, Phoenix, Arizona 85004.
- Page Public Library, 479 South Lake Powell Boulevard, Page, Arizona 86040.
- Grand County Library, Moab Branch, 257 East Center Street, Moab, Utah 84532.
- Sunrise Library, 5400 East Harris Avenue, Las Vegas, Nevada 89110.

- Denver Public Library, 10 West 14th Avenue Parkway, Denver, Colorado 80204.

- Natural Resources Library, U.S. Department of the Interior, 1849 C Street NW, Main Interior Building, Washington, D.C. 20240-0001.

The original 90-day public comment period was extended an additional 32 days (122-day total) to May 9, 2016, after several requests were received from the public and Cooperating Agencies. During the comment period, two in-person meetings and two Internet-based webinars were held to provide the public with information about the content and findings of the DEIS and to receive written comments on the DEIS. The meetings and webinars were held on the following dates:

- Webinar—Tuesday, February 16, 2016, at 6:30 p.m. Mountain Standard Time (MST);

- Meeting—Monday, February 22, 2016, at 6:00 p.m. MST, Flagstaff, Arizona;

- Meeting—Thursday, February 25, 2016, at 6:00 p.m. MST, Phoenix, Arizona; and

- Webinar—Tuesday, March 1, 2016, at 1:00 p.m. MST.

At these meetings, LTEMP staff were available to take comments and answer questions before and after presentations were made on the DEIS.

During the public comment period, the public was encouraged to submit comments electronically through the NPS Public, Environment, and Public Comment (PEPC) website. Comments were also received, however, through the mail or using a public comment form provided at the public meetings. More than 3,000 individual comment documents were received on the DEIS.

Comments were determined to be substantive or nonsubstantive in nature. NEPA regulations require that responses be provided to substantive comments. Comments are considered substantive if they:

- Challenge accuracy of analysis

- Dispute information accuracy

- Suggest different viable alternatives

- Provide new information that makes a change in the proposal In other words, they raise, debate, or question a point of fact or policy.

Comments in favor of or against the proposed action or alternatives, or comments that only agree or disagree with co-lead agency policies, are not considered substantive. Substantive comments were summarized and are presented, along with a response, per issue or impact topic in this appendix. Substantive comments were used to make changes to the DEIS when deemed appropriate and justified. Comment issues and the pages on which responses are located are presented in Table Q-1.Commenters, their affiliation (if any), and the section(s) where responses to their substantive comments are located are presented in Table Q-3, in Section 15.

Nonsubstantive comments are comments that offer opinions or provide information not directly related to issues or impact analyses. Nonsubstantive comments have been considered by the joint leads, but do not require a formal response.

PUBLIC COMMENT SUBMITTAL METRICS

Comment documents were received from 3,035 individuals; organizations (including environmental groups and other special interest groups); Tribes, private businesses (including recreational companies) and industry; and local, state, and federal agencies. Submissions were received from all 50 states plus the District of Columbia. About 12% of the submissions were from Arizona. Most submissions were received from California, at 19%. Table Q-2 shows the percentages for the five states with the most comments. Additional states that submitted more than 100 comments included Illinois, Pennsylvania, Texas, and Washington. Over 2,900 submissions were received via the LTEMP public website, and about 30 were received via postal mail. Another 20 were submitted using a comment form distributed at the Public Meetings. One petition included approximately 400 signatures.

FORM LETTERS

Over 1,400 of the 3,035 comment letters received were submitted as form letters that included the same comment language. Ten form letters were received, with submittals numbering: 15, 17, 21, 21, 24, 24, 29, 100, 166 and >1,000. Also, as noted above, one letter, a petition to enhance the Lees Ferry rainbow trout fishery, was signed by 404 individuals. The vast majority of the form letters expressed support for the preferred alternative. The form letter with over 1,000 submittals read as follows:

"Thank you for the opportunity to provide comments on the future of the Colorado River below Glen Canyon Dam. I support the preferred management plan (Alternative D) for Glen Canyon Dam, including experimental high flow releases, for the next 20 years. The Grand Canyon's native fish, recreational experiences, and other natural and cultural resources deserve this best option. It is especially important to keep daily water release fluctuations capped at 8,000 cfs. This will help preserve natural resources that provide habitat for endangered fish and the re-building of beaches along the Colorado River. Thank you for including efforts to restore riparian vegetation, which would otherwise degrade under any of the other alternatives."

TABLE Q-1 Comment Issues and Location in the Report

TABLE Q-1 (Cont.)

TABLE Q-1 (Cont.)

TABLE Q-1 (Cont.)

TABLE Q-1 (Cont.)

TABLE Q-2 Commenter Distribution by State

State	Percentage
AZ	12
CA	19
CO	5
FL	5
NY	5
All others	53

The form letter with 166 submittals and the petition with 404 signatures had nearly identical language, which recommended that the LTEMP should:

- Explicitly recognize that the Lees Ferry tailwater trout fishery as priority resource "value" for which Glen Canyon Dam should be operated as provided for in the Grand Canyon Protection Act.

- Incorporate the goals and objectives of the Arizona Game and Fish Department's Fishery Management Plan for the Lee Ferry Trout Fishery as stated goals and objectives of the LTEMP.

- Fully consider the impacts of repeated fall high flow experiments on the aquatic food base, rainbow trout, and invasive species in Glen and Marble Canyons.

- Place more emphasis on conducting high flow experiments in the spring to benefit a variety of resources besides sediment/sandbars including the aquatic food base, native fish, rainbow trout and riparian vegetation.

- Test the use of sustained low steady flows (also known as "macroinvertebrate production flows") to increase the production and diversity of the aquatic insects in the Colorado River below Glen Canyon Dam.

- Carefully test the use of Trout Management Flows (TMF), but only when there is an identified need to reduce the number of young of the year rainbow trout in Lee Ferry.

The form letter with 100 submittals simply endorsed "DOI's plan to operate the Glen Canyon Dam in a way that will best protect Grand Canyon National Park." Conversely, the form letter with 29 submittals stated that the "DEIS fails to adequately analyze the impacts of climate change on the entire Colorado River water supply system" and "should have considered a wider range of reasonable alternatives that fully take climate change into account." The remaining form letters were variations on the themes of protecting the Lees Ferry trout fishery or endorsing DOI's plan. Substantive issues raised in the form letters and in individual letters submitted are addressed in the following sections.

SUMMARY OF ISSUES RAISED IN COMMENTS ON THE DEIS AND DOI'S RESPONSES

Comment letters received on the public draft of the LTEMP EIS raised substantive issues in a number of technical areas related to the analyses presented in the EIS and in non-technical areas related to the requirements of preparing the EIS under NEPA. Comments ranged from support of the preferred alternative as is, to support with qualifications, to support of other alternatives. Some commenters disagreed with the exclusion of some proposed alternatives as not meeting the purpose and need of the proposed action, including decommissioning of the dam. Other comments questioned the adequacy of the EIS under NEPA and ESA and in addressing the effects of climate change. Many comments addressed the proposed experiments that are a part of the preferred alternative and other alternatives, their triggers, their potential effectiveness, and their potential effects on other resources not targeted by the experiments. Other comments addressed the modeling conducted to analyze effects of dam operations on resources and on the metrics produced by the models to assess impacts. A number of comments concerned the effects of daily fluctuations and minimum river flows downstream of the dam resulting from dam operations under the various alternatives. Many comments addressed the use of HFEs, their timing, potential benefits and effects on hydropower generation. These and other substantive issues are outlined in the following section. Following the outline is a section that presents a summary of each issue as raised in comments and DOI's response. Finally, an index of all comment letters submitted, the names of the commenters, and their affiliation is presented following the issues and responses section.

Comment Categories, Comment Issues, and Location Where Responses are Found

Comments issues were categorized according to a number of technical and non-technical areas based on the substantive content of the letters submitted. In addition, a large number of editorial comments were received, and we have updated the text where appropriate in response to these comments. These comments refer to specific page numbers and line numbers in the DEIS. Because the overall document pagination has changed from the DEIS to the FEIS, including the specific location of each change would have limited utility and be cumbersome. Accordingly, we have not included the specific locations of each change in this Appendix. The EIS was revised appropriately to address all substantive editorial comments, to correct typographical errors, and to add specific language submitted by Tribes.

The following outline presents the comment categories, a brief description of the issues raised, and the location in the following section where each issue is summarized and DOI's response is presented.

LTEMP CONSOLIDATED ISSUES AND RESPONSES

1 AIR QUALITY AND CLIMATE CHANGE

1.1 DELETE "NEGLIGIBLE" BECAUSE IT IS SUBJECTIVE.

Summary Comment: Commenters expressed that the term "negligible" is a biased, subjective term.

Response: For emissions of SO2 and NOx presented in Section 4.15, the term "negligible" was used to describe impacts, but the actual projected emissions (in tons/yr) and percentage change relative to Alternative A also were provided. No change was made to the text. In Section 4.16, the text was edited to remove the term negligible and only the actual projected emissions of greenhouse gases (in tons/yr) and percentage change relative to Alternative A, and current conditions in the 11-state region and the United States were provided.

1.2 MINIMIZE POTENTIAL IMPACTS BY COMPARING PROJECT-RELATED GHG EMISSIONS WITH REGIONAL TOTAL AND US TOTAL

Summary Comment: Commenters expressed that the effects of increases in GHG emissions for the alternatives should be presented on a local or regional basis, and not at a national level.

Response: Text was updated to show project-related GHG emissions compared to total regional (11 states) while still retaining U.S. GHG emissions as that level is a conventional way of assessing their impacts.

1.3 CONSIDER EFFECTS OF HFE ON GHG EMISSIONS

Summary Comment: Commenters suggested that strong consideration should be given to the air emission impacts resulting from HFEs.

Response: The analysis considered the effects of HFEs on air quality in Section 4.15 and on greenhouse gas emissions in Section 4.16. The modeling results presented in these sections included HFEs in all of the alternatives.

1.4 DISPLAY GREENHOUSE GAS (GHG) EMISSIONS INCREASE IN EVERYDAY TERMS

Summary Comment: Commenters recommended that increases in GHG emissions be expressed as an equivalent mass of coal burned using the EPA's "Greenhouse Gas Equivalencies Calculator," rather than just presenting GHG emissions in metric tons.

Response: In Table 4.16-1, we added a footnote which states, "Using an online tool from the EPA (https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator), one can express a given amount of GHG emissions in MT in everyday terms. For example, 1 million MT/yr is estimated to be equivalent to the amount of CO_2 that is emitted as a result of the electricity use of 148,000 households. However, because the EPA cautions that these estimates are approximate and should not be used for emission inventory or formal carbon footprinting exercises" the authors felt it was not appropriate to report the results in this document using that conversion.

1.5 ALTERNATIVE D INCREASES GHG EMISSIONS, NEARLY FOUR TIMES THE LEVEL ASSOCIATED WITH ALTERNATIVE A

Summary Comment: Commenters noted that Alternative D, which averages more than 1 HFE per year for the 20-year DEIS period, increases GHG emissions by 22,908 metric tons per year, nearly four times the level associated with Alternative A, which is the lowest GHG-producing Alternative due to the lowest frequency of HFEs.

Response: While the commenter is correct that Alternative D increases GHG by 22,908 metric tons per year (MT/yr), the EIS analysis found that the level of emissions for Alternative A was 55,177,668 MT/yr and the level of emissions for Alternative D was 55,200,576 Mt/yr and so the difference from Alternative A would be only 0.042%.

1.6 METHANE EMISSIONS FROM LAKE POWELL THAT CONTRIBUTE TO CLIMATE CHANGE

Summary Comment: Commenters state that preliminary estimates of methane emissions from the operation of Glen Canyon Dam and Lake Powell indicate that the combined life cycle GHG equivalents may be as high as one-third of a natural gas power plant.

Response: Because no studies on GHG emissions from Lake Powell and Grand Canyon Dam have been made, GHG emissions, such as CO_2, CH_4, and N_2O, from the reservoirs were discussed qualitatively in Section 4.16.2.1. Reservoirs such as Lake Powell would be expected to produce some amount of GHG emissions consistent with levels reported for reservoirs in the semiarid Western U.S. (Tremblay et al. 2004 and http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_p_Ap3_WetlandsCH4.pdf). However, GHG emissions from these sources and associated climate change are not anticipated to be different among the alternatives.

2 ALTERNATIVES

2.1 EIS DOES NOT COMPLY WITH NEPA

2.1.1 The DEIS Did Not Evaluate All Reasonable Alternatives

Summary Comment: Citing 40 CFR 1502.14 requiring agencies to "[r]igorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study briefly discuss the reasons for their having been eliminated." Commenters stated that the LTEMP EIS process does not appear to comply with NEPA because Reclamation and NPS (i) did not objectively evaluate all reasonable alternatives, (ii) failed to assess mitigation measures regarding sediment issues, and (iii) appeared to utilize a partial decision making process.

Response: The LTEMP EIS carried forward a range of reasonable alternatives that were developed based on the input of DOI experts, Cooperating Agencies, stakeholders, Tribes and the public. Early alternative concepts were provided to cooperators and stakeholders for input and a public meeting was held on in April of 2012 to further explore and characterize those concepts. Mitigation measures within the scope of this EIS that fit the purpose and need were considered. The decision making process for this EIS conforms with the established NEPA process and considered input from the public, cooperators, stakeholders and Tribes. This NEPA document provides detailed analysis for a broad range of alternatives ranging from those proposed for ecological purposes, and those proposed by hydropower interests and focused on hydropower generation to, and those proposed to strike different a balances among all resource areas.

Alternatives F and G, the seasonally adjusted steady flow and year round steady flow alternatives were proposed by members of the public and interest groups during scoping. These alternatives were similar to ones considered in the 1996 EIS as well. These alternatives considered as part of a range of reasonable alternatives and these showed many positive and negative impacts on a variety of resources as were disclosed in the draft impact statement. The preferred alternative showed a better balance between resources to achieve the purpose and need.

Full powerplant capacity operations were considered and eliminated as an alternative as discussed in Section 2.3.10 because fluctuation levels to the degree proposed would have adverse impacts on many downstream resources and would not meet the purpose and need for this EIS. Alternative B was originally crafted and submitted by CREDA, a power utility stakeholder. It has a greatly increased daily range compared to the No Action alternative and it includes an experimental implementation of maximum powerplant capacity releases. This alternative showed a number of positive and negative impacts on a variety of resources as were disclosed in the DEIS. The preferred alternative showed a better balance among resources to achieve the purpose and need. [519951]

DOI believes the EIS is in full compliance with NEPA regulations. The USEPA reviewed the DEIS and determined that, based on their review, rated the preferred alternative as "Lack of Objections-Adequate," the highest rating possible.

2.1.2 No Alternative Featured Greatly Increased Hydropower

Summary Comment: Commenters stated that, none of the alternatives feature greatly increased (hydropower) flexibility and that the Agencies should provide more explanation regarding why an alternative with even more daily flexibility was not considered. Others stated that the LTEMP EIS preferred alternative does not meet the renewable resource goal of NEPA Section 101 (b) 6 or the hydropower resource goal established by the DOI for the LTEMP EIS process due to restrictions on the utilization of Glen Canyon Dam for hydropower production under the preferred alternative

Response: Full powerplant capacity operations were considered and eliminated as an alternative as discussed in Section 2.3.10 because fluctuation levels to the degree proposed would have adverse impacts on many downstream resources and would not meet the purpose and need for this EIS. Alternative B was originally crafted and submitted by CREDA, a power utility stakeholder. It has a greatly increased daily range compared to the No Action alternative and it includes an experimental implementation of maximum powerplant capacity releases. This alternative showed a number of positive and negative impacts on a variety of resources as were disclosed in the DEIS. The preferred alternative showed a better balance between resources to achieve the purpose and need.

The analysis performed in this EIS is fully consistent with both the hydropower resource goal in Section 1.4 and the goal set forth in the "policies and goals" subchapter of NEPA, including the cited goal in Section 101(b)(6). Hydropower impacts and consistency with the hydropower resource goal are discussed in Section 4.13. Regarding Section 101(b)(6) of NEPA, this is a general statutory statement that Congress that cannot be read in isolation. Instead, it must be read in connection with the Law of the River, the GCPA, and other statutory provisions specific to operations of Glen Canyon Dam. When these authorities are read together, Congress has established specific requirements for the operation of Glen Canyon Dam. This EIS considers those specific requirements and identifies a preferred alternative that meets the purpose and need and achieves an appropriate balance for meeting the objectives

2.1.3 Experiments are not Adequately Defined or Analyzed

Summary Comment: One commenter stated that Alternative D violates the requirements of NEPA because it contains experiments or other proposed actions that are not adequately defined or analyzed. Another commenter stated that "poorly defined experimental conditions, coupled with the unquantified discretion of the DOI to determine whether there are "adverse effects" on "other resources" renders the EIS legally inadequate because it does not contain the required "hard look" at the environmental and other impacts of the proposed action."

Response: The co-lead agencies feel that this NEPA process takes a comprehensive "hard look" at the proposed action and alternatives to determine whether there are "adverse effects" on "other resources" and is fully consistent with NEPA. As stated in Section 2.2.4.3, This EIS analyzed a wide range of conditions that could occur and states the potential effects in the document.

DOI disagrees with the statement that experiments or other proposed actions are not adequately defined or analyzed. Extensive detail on the costs of experiments appears in Appendix K and text was added to Section 4.13.2.3 to more fully describe effects to hydropower from all experiments. The LTEMP EIS describes experiments to be conducted under different alternatives in sufficient detail to allow for a full analysis of their effects. Extensive modeling of the effects of these alternatives on a full set of resources was conducted and formed the basis of the assessment presented in the EIS. These modeling results were supplemented with qualitative assessments of effects based on existing literature and observations. An assessment of the cumulative impacts of LTEMP alternatives in combination with other past, present, and reasonably foreseeable future impacts is presented in Section 4.17 of the EIS. GCMRC has developed a science plan that describes the information that will be gathered during implementation of the LTEMP, and how that information would be used in an adaptive management context.

The adaptive management process and triggers are adequately addressed in this NEPA document. Section 4.1 and Appendices C and K of the LTEMP DEIS have detailed information on the extensive modeling that was performed with a variety of long term strategies and referring to uncertainties explicitly. The range of adaptations are also well defined and analyzed in the EIS. Text was added between the DEIS and the FEIS to further define this and state specifically under each experiment how magnitudes, duration or frequencies of components of the experiments may change. The long term strategies were variations of the alternatives that turned various experiments "off" or "on" to model different combinations and frequencies of experiments under a variety of hydrologic inflow conditions. This extensive modeling was coupled with extensive literature review and subject matter expert input to provide thorough analysis. This is sufficient for a NEPA analysis. Additional details of experiments and monitoring will be developed through the AMP annual work plans.

DOI believes the EIS is in full compliance with NEPA regulations. The USEPA reviewed the DEIS and determined that, based on their review, rated the preferred alternative as "Lack of Objections-Adequate," the highest rating possible

2.2 EIS DOES NOT COMPLY WITH ESA

Summary Comment: Commenters stated that the LTEMP EIS does not comply with the Endangered Species Act because considered experiments, operations or management actions are quite likely to result in negative impacts to an endangered species.

(1) In addition, DOI should seek input from AMWG and TWG representatives on the draft Biological Assessment under the ongoing Species Status Assessment for HBC, which could improve and refine experimental treatments in the Preferred Alternative and clarify triggers, off ramps, monitoring and definitions of success.

(2) Further, Alternative D is incompatible with the ESA, in part because there are no binding obligations or criteria or required mitigation that protect the endangered HBC.

(3) Because the DEIS fails to define "annual implementation considerations" and "off-ramps," so nearly every experimental treatment will be undertaken unless there are "potential unacceptable impacts" on certain defined and undefined resources.

(4) A commenter stated that the failure of the DEIS to include and consider the cumulative impacts all of the HFEs, including the effects on rainbow trout recruitment and humpback chub from the 2013 and 2014 HFEs, represents a significant analytical flaw, and that it is inappropriate to consider 250 hour long HFEs due to erosion concerns.

(5) A number of people commented that the EIS did not consider or should have considered more the restoration of extirpated species and recovery implementation plans for all species known to be native to Grand Canyon prior to the operation of Glen Canyon Dam.

(6) With respect to proposed low summer flows, one commenter supports convening a panel of experts to analyze existing science on low summer flows within the first 5 years of the LTEMP period.

(7) With respect to sustained low flows for benthic invertebrate production, a commenter requested a comprehensive review of these flows by a scientific panel during the first several years of the LTEMP period to determine their cost, efficacy, and impact on native and nonnative fish.

Response: DOI has consulted with the U.S. Fish and Wildlife Service and developed conservation measures and alternative-specific experimental actions to avoid, minimize, and mitigate adverse impacts on endangered species and critical habitat potentially affected by the proposed action. The Biological Assessment is found in Appendix O in the final EIS. [519929] DOI has been consulting with FWS throughout the 5-year EIS process. The LTEMP EIS used the best available science and peer-reviewed modeling in its analysis of the effects of the proposed action and alternatives on endangered species and critical habitat.

(1) In developing the Biological Assessment for LTEMP, Reclamation convened an ad hoc group of Grand Canyon aquatic biologists from FWS, GCMRC, AZGFD, NPS, and Reclamation to develop the conservation measures, experimental actions, and trigger levels for those actions to be included in the EIS. GCMRC scientists have been involved since scoping with development of LTEMP alternatives and have provided information, research results, and expert opinions regarding the effects of the proposed action on endangered species and critical habitat throughout the EIS process. Also several Cooperating Agencies, including Tribes and Western Area Power Administration were given a chance to review the Biological Assessment and the proposed conservation measures were presented to the AMWG members at the August 2016 AMWG meeting. The Biological Assessment was updated to incorporate feedback and input resulting from these reviews.

The FWS humpback chub species status assessment that the commenter refers to is in process and will not be completed until well after the publication of the LTEMP FEIS. It is

not required to be complete for the FEIS or the record of decision, and is therefore independent of this NEPA process.

Greater specificity regarding triggers for HFE implementation and humpback chub actions have been added to the EIS (Appendices O and P).

(2) Formal consultation with FWS has resulted in a Biological Assessment and Biological Opinion on the effects of the proposed action on listed species and designated critical habitat, as presented in Appendix O of the EIS. DOI has worked closely with FWS throughout the 5-year EIS process to ensure that the appropriate experiments, dam operations, and non-flow actions were identified in the proposed action or as conservation measures. LTEMP EIS alternatives include experiments that are intended to improve conditions for ESA-listed species and other special status species. The LTEMP EIS team used the best available science and peer-reviewed modeling to determine the potential effects of these alternatives on these species.

Throughout the LTEMP DEIS drafting process, the parties to the DEIS have consistently prioritized the conservation of humpback chub and its habitat. FWS, the expert agency on endangered species issues, has been involved in the DEIS process from its inception. GCMRC scientists, who specialize in studying HBC and its habitat, have also provided valuable input regarding HBC during this process.

(3) The LTEMP EIS did consider and define "annual implementation considerations" and "off-ramps" for experiments. The implementation framework for Alternative D (Section 2.2.4.3 of the EIS) explicitly calls for the consideration of key resources (including endangered and threatened species and their designated critical habitat) when determining which experiments to conduct in any given year. The framework also establishes off-ramps that would identify when experiments should no longer be conducted if it was established there were potential unacceptable adverse impacts to endangered species and critical habitat. As described in Section 2.2.4.4, DOI will also exercise a formal process of stakeholder engagement to ensure decisions are made with sufficient information regarding the condition and potential effects on important resources. GCMRC has developed a science plan that describes the information that will be gathered during implementation of the LTEMP, and how that information would be used in an adaptive management context in order to promote the conservation of humpback chub and other species of concern.

(4) The LTEMP EIS did fully consider direct, indirect and cumulative effects of HFEs. Descriptions of the observed effects of HFEs conducted in 2012, 2013, and 2014 have been added to the EIS. The impacts of HFEs on other resources, including endangered species and hydropower, were fully analyzed in the EIS. The EIS acknowledges that experimental testing may provide new information about the effects of extended-duration fall HFEs on endangered species and their habitat. If that experimentation results in significant new information about potentially adverse impacts, outside of what was analyzed in this NEPA process then additional NEPA reviews would be completed as appropriate. These HFEs would only be conducted in years of very large sand input from the Paria River during the fall accounting period and the duration would be adjusted to be compatible with the magnitude of the sand input. Extended-duration fall HFEs would only be allowed in 4 of the

20 years of the LTEMP period and spring HFEs would not be allowed in the same water year to mitigate the cumulative impact of sequential HFEs. In addition, consideration would be given to their effects on key resources including water delivery, the Basin Fund, endangered species, and sediment.

(5) The reintroduction of extirpated species was outside the scope of this EIS and is discussed in Section 1.5.3.

LTEMP EIS alternatives include experiments that are intended to improve conditions for ESA-listed species and other special status species. The LTEMP EIS team used the best available science and peer-reviewed modeling to determine the potential effects of these alternatives on these species. DOI has worked closely with FWS throughout the 5-year EIS process to ensure that the appropriate experiments, dam operations, and non-flow actions were identified as conservation measures. Formal consultation with FWS has resulted in a Biological Assessment and Biological Opinion on the effects of the proposed action on listed species and designated critical habitat, as presented in Appendix O of the EIS.

The original notice of intent to prepare the LTEMP EIS identified the need to determine whether to establish a recovery implementation program for endangered fish species below Glen Canyon Dam. The LTEMP team found that identifying the need to determine whether to establish a recovery implementation program (RIP) for endangered fish species below Glen Canyon Dam did not meet the purpose and need for the action.

(6) Additional description of the implementation process for low summer flows has been added to the EIS (Section 2.2.4.6) including convening a scientific panel that includes independent experts prior to the first potential use of low summer flows to synthesize the best available scientific information related to low summer flows. Based on input from GCMRC, FWS, and joint-lead experts, we feel the additional restriction of only implementing the first test of low summer flows if humpback chub population status is robust is not needed because any test of low summer flows would consider the possibility for unacceptable adverse impacts to endangered species and critical habitat, and implementation of such a test may be delayed until conditions were suitable and unacceptable adverse impacts were minimized.

(7) We acknowledge that testing may be needed to determine the efficacy of macroinvertebrate production flows in this ecosystem, but find there is sufficient evidence for testing this tool experimentally. We acknowledge the potential for macroinvertebrate production flows to lead to increases in trout numbers. As described in Section 2.2.4.6, the "effects of the test would be evaluated…" and "…could be discontinued if there were unacceptable effects on other resources." Furthermore, we have consulted with FWS and GCMRC, and they both regard the experiment as low risk to the humpback chub population.

2.3 EIS DOES NOT COMPLY WITH CRSPA

Summary Comment: Several commenters have stated that the DEIS has improperly excluded hydropower enhancing alternatives and that the preferred alternative runs counter to the Grand Canyon Protection Act, the implementation of which is subject to and must be consistent with

Colorado River Storage Project Act (CRSPA). Under Section 7 of CRSPA, hydroelectric power plants are under CRSP A are to be operated "so as to produce the greatest practicable amount of power and energy that can be sold at firm power and energy rates." Alternative B outperforms Alternative D in this regard, while Alternative D provides no experiments to benefit hydropower, which would benefit HBC. Commenters state that the DEIS considers only the water management aspects of CRSPA and disregards the hydropower enhancement aspects and that the GCPA and CRSPA must be considered together, giving full consideration to each and that hydropower enhancement was disregarded because it did not conform to the agencies preconceived notion of where the program was to go. Finally, one commenter stated that the LTEMP is deficient as a management program because ignores the legal responsibility to explore mitigation strategies that would allow the use of the dam for its hydropower generating purposes as originally intended and that mitigation strategies are available that will benefit the trout fishery, reduce mechanical removals, stabilize sediment, and enhance river running while providing hydropower in a load following context. One commenter stated that environmental studies thus far completed and proposed do not support disruptions to continued dam management for water and power with either only negligible or zero species improvements and in the absence of reliably identifiable cause/effect and resulting benefit correlations, they urged prioritization of CRSP hydroelectric power purposes for the Glen Canyon Dam operations.

Response: Contrary to statements in the comment, the LTEMP EIS did evaluate and present the results for an alternative that increased hydropower generation. Alternative B was originally crafted and submitted by CREDA, a power utility stakeholder. It has a greatly increased daily range compared to the No Action Alternative and it includes an experimental implementation of maximum powerplant capacity releases. This alternative showed a number of positive and negative impacts on a variety of resources as were disclosed in the EIS. The preferred alternative showed a better balance between resources to achieve the purpose and need of the proposed action.

DOI formulated the characteristics of the preferred alternative based on initial modeling of a set of 6 alternatives. There were several characteristics that were chosen to specifically reduce cost to the hydropower resource including increasing the fluctuation factor from 7 to 10 in high demand months, adjusting the monthly release pattern to match WAPA's Contract Rate of Delivery, increasing the volume of water in the high demand month of August from 750 to 800 kaf in 8.23 maf years, and eliminating steady flows after HFEs. Many objectives and resource goals were considered in the LTEMP EIS. No one alternative was found which met all goals and objectives. Alternative D performed the second best out of the action alternatives on the hydropower metrics while also meeting the purpose and need and providing the best balance of resource impacts to comply with the Grand Canyon Protection Act and protect, mitigation and improve downstream resources. The preferred alternative was identified as the best balance for meeting the purpose and need of the LTEMP EIS.

Full powerplant capacity operations were considered and eliminated as an alternative as discussed in Section 2.3.10 because fluctuation levels to the degree proposed would have adverse impacts on many downstream resources and would not meet the purpose and need for this EIS.

The DEIS is consistent with both Section 7 of CRSPA and the GCPA. The CRSPA and the GCPA are both statutes that concern operation of Glen Canyon Dam, and the GCPA expressly acknowledges that the Secretary shall implement the GCPA "in a manner fully consistent with and subject to the Colorado River Compact, the Upper Colorado River Basin Compact, the Water Treaty of 1944 with Mexico, the decree of the Supreme Court in Arizona v. California, and the provisions of the Colorado River Storage Project Act of 1956 and the Colorado River Basin Project Act of 1968 that govern allocation, appropriation, development, and exportation of the waters of the Colorado River basin." Accordingly, the Secretary has considered both statutes in this NEPA process analyzing the operation of Glen Canyon Dam. Regarding the "Full-Powerplant Capacity Operations Alternative", as explained in the EIS (see Section 2.3.10), this alternative was rejected because it would not meet the purpose, need, and objectives of the LTEMP including compliance with the GCPA. However Alternative B described in Section 2.3.2 and analyzed in Chapter 4 includes a test of "hydropower improvement flows" that featured wide daily fluctuations (up to 20,000 cfs in some years and months).

2.4 SUPPORT ALTERNATIVE D

Summary Comment: Numerous commenters support Alternative D, the preferred alternative, some noting that Modulated flows as set out in Alternative D will better accomplish the stated objective- "...to protect, mitigate adverse impacts on, and improve the values for which GCNP and GCNRA were established, including, but not limited to natural and cultural resources and visitor use.

Response: Alternative D was identified as the preferred alternative because it met the purpose and need of the proposed action while achieving the best balance between downstream resource protection and hydropower production. It was the second best of the action alternatives in terms of hydropower performance.

2.5 SUPPORT ALTERNATIVE D WITH CAVEATS

Summary Comment: A number of commenters support Alternative D with some changes or caveats:

(1) Modify the HFE trigger to allow for more frequent spring HFEs that are aimed at benefitting a variety of priority resources besides sediment/sandbars, including aquatic food base, the endangered humpback chub and razorback sucker, other native fishes, the rainbow trout fishery, and riparian vegetation.

(2) Support and opposition to low summer flows.

(3) Support testing of sustained low steady flows (macroinvertebrate production flows) designed to increase the production and diversity of the aquatic insects in the Colorado River below Glen Canyon Dam and recommend testing of macroinvertebrate production flows very early in the 20-year implementation process.

(4) Prefer fewer HFEs in general, as many fishermen and fishing guides believe that repeated/frequent fall HFEs may be adversely impacting the rainbow trout fishery and the aquatic food base.

(5) Support continued testing of fall HFEs, but noting that extended duration HFEs up to 10 days in length, need to carefully consider potential impacts to the aquatic food base, rainbow trout, and invasive species in both Glen and Marble canyons

(6) The alternative should employ actions to prevent low dissolved oxygen levels that could be harmful to fish. In general, flows below 8000 cfs should be avoided if the condition of trout or food base is poor, water temperatures are above average, and DO levels are below average.

(7) Support careful testing of Trout Management Flows (TMFs) when there is an identified need to reduce the number of young of the year rainbow trout in Lee Ferry agreement is reached with AZGFD that the trout population can withstand a TMF experiment that has the potential to eliminate a recruitment year class.

(1) Response: The implementation framework for Alternative D (Section 2.2.4.3 of the EIS) explicitly calls for the consideration of key resources, including the trout fishery, when determining which experiments to conduct in any given year. The framework also establishes off-ramps that would identify when experiments should no longer be conducted due to unacceptable adverse impacts. As described in Section 2.2.4.4, DOI will also exercise a formal process of stakeholder engagement to ensure decisions are made with sufficient information regarding the condition and potential effects on important resources.

The EIS discloses effects related to the frequency of spring HFEs. Based on modeling and analysis, there are potential positive and negative benefits to downstream resources from spring HFEs. DOI has reviewed the parameters under which spring HFEs are conducted and the way in which the accounting periods are applied. Under the preferred alternative, there would be 4-7 spring HFEs on average over the 20 year period, and there would testing and monitoring of impacts. Under the preferred alternative, spring HFE's are triggered based upon sediment or hydrology triggers. GCMRC was consulted on the potential to modify the accounting periods and the scientists most familiar with the protocol did not believe it warranted a change in accounting periods. The DOI feels that the frequency of spring HFEs in the preferred alternative provides the appropriate balance between potential positive and negative impacts.

(2) The EIS discloses effects related to low summer flows. Positive benefits include potential warming that could help with humpback chub spawning in the mainstem, and negatives include hydropower impacts and potential concerns related to trout recruitment, water quality, recreation and other concerns. The FEIS includes additional language regarding the review of scientific information that would occur prior to use of this tool in the second ten years of the LTEMP experimental period. DOI feels that the preferred alternative provides an appropriate balance between those positive and negative impacts.

(3) The preferred alternative would allow for the possibility of testing macroinvertebrate production flows early in the LTEMP period. The decision would be based on the recommendations from GCMRC for the conditions of the year and for good experimental design including avoiding confounding results based on the experiments. The process under the preferred alternative includes communication and input from agencies including AZGFD. The impact of these flows on the aquatic food base, trout, and other species are discussed in the EIS.

(4) The EIS discloses effects related to the frequency of HFEs. The frequency of HFEs varies between alternatives and further modeling and evaluation was performed on long term strategies that has HFEs "turned on" or "turned off" for various modeling runs. Based on evaluation of these modeling results, on analyses of published studies and on input from cooperators and the public, the DOI feels that the preferred alternative provides an appropriate balance between those positive and negative impacts.

(5) The best available science related to the potential effects of extended duration HFEs on trout and other resources were incorporated into the analysis. The experiments include various "off ramps" in order to respond to potential impacts in the basin, including unacceptable adverse impacts outside of what was analyzed in the EIS to the rainbow trout fishery. In addition, impacts to recreation economics and other resources were included in the EIS. Consideration of unacceptable effects of sequential HFEs, including extended-duration fall HFEs, is explicitly identified in the EIS as a concern to be addressed before implementation. DOI feels that the preferred alternative includes an appropriate level of caution and consideration regarding the use of extended duration HFEs.

(6) The preferred alternative does not include flows to address low dissolved oxygen levels in the Lees Ferry area. This concern has only been documented as occurring in one year and the recommendations from GCMRC at this time are to monitor this issue to learn more about those potential conditions prior to considering experimental actions. The joint leads recommended to GCMRC to include this consideration of monitoring in their science plan to accompany the LTEMP.

(7) The use of TMFs has been designed as a tool for managing the trout population with respect to downstream endangered fish concerns but would also be expected to result in a healthier trout fishery with less population oscillation due to density dependence. Regardless of purpose, the trigger for this tool would be a large predicted trout recruitment event. Under these circumstances, TMFs would be expected to have positive benefits for endangered species and the stability and health of the trout fishery. Under the preferred alternative, AZGFD would be involved in annual implementation and planning discussions and Tribes would be consulted regarding the use of this tool. DOI feels that the preferred alternative includes an appropriate level of caution and consideration regarding the use of trout management flows.

2.6 SUPPORT ALTERNATIVE B

Summary Comment: Commenters expressed a preference for Alternative B, stating that Alternative B outperforms all other action alternatives for nearly all resources, and is the only action alternative that addresses the stated hydropower objective of the LTEMP EIS. In addition, DOI should consider eliminating the 8,000 cfs cap on daily fluctuations, eliminate low summer flow experiments, reduce HFE experiments to no more than one every other year, and allow operation at full power plant capacity. In comparison to Alternative D, commenters stated that Alternative B has lower air emissions and performs better than Alternative D across a wide range of resources considered in the LTEMP DEIS - humpback chub, air emissions, archeological resources, recreation value, retail power rates, hydropower value, increase in native vegetation, and water quality among others. In addition, Alternative D proposes a series of treatments which appear to be counterproductive and which would require subsequent treatments that would otherwise be unnecessary, specifically, as noted on p. 4-67, that subsequent HFEs erode the sandbars potentially benefitted by earlier HFEs. Further, Alternative D maintains an artificial intraday fluctuation cap of 8,000 cubic feet per second (cfs), while DOI has failed to show that the same cap under current operations benefits other resources. Finally, the DEIS reveals a bias towards the sediment resource, but is flawed because it considers flows as the only available method for improving the sediment resource.

Response: Alternative B was originally crafted and submitted by CREDA, a power utility stakeholder. It has a greatly increased daily range of water flows compared to the No Action Alternative and it includes an experimental implementation of maximum powerplant capacity releases. This alternative showed a number of positive and negative impacts on a variety of resources as were disclosed in the EIS. The preferred alternative, Alternative D, showed a better balance of effects to resources to achieve the purpose and need of the proposed action. Alternative D performed the second best out of the action alternatives on the hydropower metrics while also meeting the purpose and need and providing the best balance of resource impacts to comply with the Grand Canyon Protection Act and protect, mitigate and improve downstream resources.

As stated in Section 2.4.1, DOI considers sediment augmentation to be outside the scope of the LTEMP EIS because it is currently economically infeasible and would require additional congressional authorizations.

Modeling and NEPA analysis indicates that Alternative B would perform better than other alternatives for hydropower, however the joint leads identified Alternative D as the preferred alternative because it better satisfies the purpose and need of the proposed action and performed better than Alternative B for most other resources.

Note that the wording of the hydropower objective as presented in the EIS is "Maintain ***or*** increase Glen Canyon Dam electric energy generation, load following capability, and ramp rate capability, and minimize emissions and costs ***to the greatest extent practicable, consistent with improvement and long-term sustainability of downstream resources*** [emphasis added]." With this definition, all of the alternatives considered in the EIS satisfy the hydropower objective; however, the performance varies by alternative. It should be noted that Alternative D performed second best for hydropower out of all the action alternatives.

As stated in Section 4.5.2.3, "The average minimum number of adult humpback chub was highest for Alternatives B, D, and E, slightly lower under Alternatives A and C, and lowest under Alternatives F and G (Figure 4.5-8). These results indicate that although there are small differences among the alternatives with regard to the predicted minimum number of adult humpback chub in the Little Colorado River aggregation, all alternatives would maintain the population above at least 1,000 adults throughout the 20-year LTEMP period." It should be noted that the modeling for Alternative D showed improvement for humpback chub abundance; slightly higher abundance than No Action. Alternative D also includes macroinvertebrate production flow experiments which are expected improve the food base for humpback chub.

As stated in Section 4.15.2, "For both SO_2 and NO_x, steam turbine (coal plant) emissions are slightly lower under Alternatives F and G…. even though these two alternatives generate <2% less Glen Canyon Dam energy than the fluctuating flow alternatives…" such as Alternative B. "Net NO_x emissions related to spot market sales and purchases are lowest (greatest negative value) for the steady flow Alternatives F and G, and highest for the fluctuating flow Alternatives B and A. Net SO_2 spot market emissions are essentially the same across alternatives." However, "Given the very small differences in the estimated emissions after considering all of the factors discussed above and in light of the uncertainty of emissions modeling, it may be concluded that emissions would be similar under all of the alternatives."

As stated in Section 4.16.3, "There are expected to be some differences in the emissions of GHGs among the LTEMP alternatives." All differences were less than 0.1% of the total emissions and less than 0.0005% at the 11-state regional scale and less than 0.0001% at the US scale. The minor differences among alternatives are reported in Section 4.16.3.

The 8,000 cfs maximum daily fluctuation cap that is currently in place has been in place since 1996. The cap is present in both No Action and the preferred alternative. It was put in place in 1996 to address safety, recreation and sediment concerns. The LTEMP EIS analysis has found that the same concerns still apply. The 8,000 cfs maximum daily fluctuation is based on the 1995 Bishop study, which was reviewed by DOI experts and found to still be the best available information and appropriate for this EIS. The Bishop study surveyed both the river guides and the general public regarding preferences and the river guides reported a preference for a maximum of 8,000 cfs daily change for a "tolerable recreation experience" under relatively high average daily flows. See Appendix J, where table J-1 has been updated to show the survey responses at a range of flow levels. The 8,000 cfs maximum daily fluctuation in the preferred alternative is consistent with the over 1,000 comment letters received from river guides and members of conservation groups on the DEIS specifically stating the preference for retaining the 8,000 cfs maximum daily fluctuation in the preferred alternative that is currently in place for No Action.

Under Alternative D, low summer flows are only considered in the second ten years as an experiment and would only be performed more than once if the first test was shown to be successful in terms of effects to the humpback chub population. As disclosed in the DEIS, there are potentially negative impacts of lower summer flows to hydropower, bacteria/pathogens, vegetation, and food base/aquatic invertebrates. In terms of positive benefits, the modeling showed potential modest temperature increases which may be beneficial to humpback chub

populations under certain conditions. When considering individual model traces, variations in downstream temperatures were generally greatest in July (nearly 3°C warmer for low summer flows) and least in September (about 1°C warmer for low summer flows), with August falling in the middle (approximately 2°C warmer for low summer flows). In many meetings and consultations, GCMRC and FWS staff have expressed their expert opinions that LSFs are considered a low risk experiment to endangered fish and a potentially useful tool worthy of experimental testing because of the potential improvement to humpback mainstem spawning.

As determined by the modeling conducted for Alternative B, a reduction in HFE frequency to no more than one every other year would reduce sandbar building with potential negative impacts on camping and riparian species. Implementation of full powerplant capacity operations ("hydropower improvement flows" of Alternative B) would have adverse impacts on a number of downstream resources including aquatic food base, native fish, riparian vegetation, wildlife, cultural resources, and recreation.

Full powerplant capacity operations were considered and eliminated as an alternative as discussed in Section 2.3.10 because fluctuation levels to the degree proposed would have adverse impacts on many downstream resources and would not meet the purpose and need for this EIS. Alternative B was originally crafted and submitted by CREDA, a power utility stakeholder. It has a greatly increased daily range of water flows compared to the No Action alternative and it includes an experimental implementation of maximum powerplant capacity releases. This alternative showed a number of positive and negative impacts on a variety of resources as were disclosed in the DEIS. The preferred alternative showed more positive than negative effects to resources, as compared to Alternative B, to achieve the purpose and need.

Although Alternative D was projected to increase greenhouse gas emissions relative to Alternatives A and B, this difference was 22,908 "metric" tons not "million" tons. This increase represents a very small percentage (0.042%) of the greenhouse gas emissions that would result from the actions considered in Alternative A. The analysis for the EIS determined that under Alternative D, there would be a 152% increase in the sand load index (a measure of sandbar building potential) and a 47% decrease in the sand mass balance index, the lowest decrease of all the action alternatives. No one alternative was found which performed best for all goals and objectives. The preferred alternative was identified as the best balance for meeting the purpose and need of the LTEMP EIS.

2.7 SUPPORT ALTERNATIVE A

Summary Comment: Commenters expressed support for Alternative A, the no-action alternative, noting that Alternative A outperforms Alternative D with respect to a number of resource interests, and that Alternative A and Alternative B are the only two alternatives that meet the goal to "maintain or improve hydropower production." Some of the commenters acknowledged that the Preferred Alternative (Alternative D) has been changed to improve hydropower compared to how it was originally proposed, with more volume in the peak power month of August and more fluctuation in general, and could conditionally support it with the following changes: (i) increased daily fluctuations to 12 times monthly volume (in kaf) in June-August., and 10 times monthly volume (in kaf) in other months; (ii) removal of the 8,000 cfs fluctuation

cap; (iii) inclusion of hydropower improvement flow experiments; (iv) limitation of HFEs to a maximum of one occurrence per calendar year, and (v) exclusion of low summer flow experiments.

Response: DOI formulated the characteristics of the preferred alternative based on initial modeling of a set of 6 alternatives. There were several characteristics that were chosen to specifically reduce cost to the hydropower resource including increasing the fluctuation factor from 7 to 10 in high demand months, adjusting the monthly release pattern to match WAPA's Contract Rate of Delivery, increasing the volume of water in the high demand month of August from 750 to 800 kaf in 8.23 maf years, and eliminating steady flows after HFEs. Many objectives and resource goals were considered in the LTEMP EIS. No one alternative was found which met all goals and objectives. Alternative D performed the second best out of the action alternatives on the hydropower metrics while also meeting the purpose and need and providing the best balance of resource impacts to comply with the Grand Canyon Protection Act and protect, mitigate and improve downstream resources. The preferred alternative was identified as the best balance for meeting the purpose and need of the LTEMP EIS.

The increases in fluctuation described in the comment were all analyzed in the document in association with other alternatives and showed a number of positive and negative impacts to resources that led to those other alternatives not being identified as the preferred alternative. The preferred alternative performed the best with the fluctuation levels it currently has to address the concerns of endangered species, sediment, hydropower and other related resources.

Note that the wording of the hydropower objective as presented in the EIS is "Maintain or increase Glen Canyon Dam electric energy generation, load following capability, and ramp rate capability, and minimize emissions and costs to the greatest extent practicable, consistent with improvement and long-term sustainability of downstream resources [emphasis added]." With this definition, all of the alternatives considered in the EIS satisfy the hydropower objective; however, the performance varies by alternative. It should be noted that Alternative D performed second best for hydropower out of all the action alternatives.

2.8 SUPPORT ALTERNATIVES CONSIDERED BUT REJECTED

Summary Comment: Commenters expressed support for alternatives that were considered but rejected, specifically for the "Fill Lake Mead First, "Run of the River," and Decommission Glen Canyon Dam" alternatives. None of the retained alternatives, the commenters state, would be viable in the event of catastrophic reductions in Colorado River flows due to climate change, would adequately address the impacts of Glen Canyon Dam in driving the decline of Lake Mead, is capable of curtailing and reversing and the harm caused by to Glen Canyon under Lake Powell reservoir, or alleviates the effects of the dam's holding back sediment. DOI's justification for rejecting the alternatives is obsolete in the context of dramatic climate change impacts, while the current infrastructure for providing municipal water supplies through Glen Canyon Dam in unsustainable. Commenters also requested the analysis of a new alternative employing a historically based hydrograph alternative that attempts to restore hydrological functions that would benefit vegetation and possibly beaches. Other commenters stated that the LTEMP

alternatives would not be viable under catastrophic reductions in Colorado River flows due to climate change, nor adequately address the impacts of Glen Canyon Dam in driving the decline of Lake Mead. DOI's rationale for rejecting the proposed The "Fill Mead First Alternative" and "The Run-of-the-River Alternative" would be obsolete under severe climate change. Further, none of the alternatives analyzed the possibility that continued decline of Lake Mead could trigger a "shortage declaration" under the 2007 Interim Guidelines or an even more extreme "Compact Call," under which lower Colorado River basin states would legally compel the upper basin states to deliver their water allocation under the Law of the River.

Response: The LTEMP team developed a set of alternatives that represented the full range of reasonable experimental and management actions; met the purpose, need, and objectives of the proposed action; and were considered within the constraints of existing laws, regulations, and existing decisions and agreements. Other alternatives such as the "Fill Mead First," "Run-of-the River" and "Decommissioning the Dam" proposals were not included in the EIS because they would not meet the purpose, need, or objectives of the proposed action (see Sections 2.3.9 and 2.3.10). These alternatives would not allow compliance with water delivery requirements including the Law of the River and 2007 Interim Guidelines (Reclamation 2007a,b), and would not comply with other federal requirements and regulations, including the GCPA.

The EIS presented an analysis of historical hydrographs to determine how the alternatives would perform under the drier conditions of climate change conditions, and found that, although the resource impacts under climate change would be different from those under historic hydrology, the relative performance of alternatives would be consistent relative to each other. This indicated that Alternative D would continue to be the best of the alternatives under a changed climate.

The "Fill Mead First" proposal was not included in the DEIS because it would not meet the purpose, need, or objectives of the proposed action (see Section 2.3.9). The alternative would not allow compliance with water delivery requirements including the Law of the River and 2007 Interim Guidelines (Reclamation 2007a,b), and would not comply with other federal requirements and regulations, including the GCPA.

Regarding whether the annual volume of water moving from the Upper Colorado River Basin to the Lower Colorado River Basin should be changed for the purpose climate change considerations, annual volume determinations are presently implemented through the LROC as currently implemented through the 2007 Interim Guidelines. Consistent with the GCPA, and the purpose and need for this proposed action, any changes to annual volume determinations are beyond the scope of this NEPA analysis. Accordingly, the Proposed Action in the draft EIS does not require the Federal agencies (NPS and BOR) to either create a plan for providing water to the Colorado River in Grand Canyon during extended drought periods or develop a basin wide plan for the operations of all dams.

In December 2012, Reclamation and agencies representing the seven Colorado River Basin States completed the Colorado River Basin Water Supply and Demand Study (Reclamation 2012e). The purpose of the Study was to define future imbalances in water supply and demand in the Basin through the year 2060, and to develop and analyze options and strategies to resolve those imbalances. The study used several different scenarios for both supply and demand to capture a range in potential future conditions.

The LTEMP EIS includes an analysis of meeting water delivery requirements under historic hydrology (Section 4.2.2.1) and climate change scenarios (Section 4.16.2.2). This analysis demonstrated that, although there were differences in the performance of alternatives under historic and climate change scenarios, the same relative performance of alternatives was observed under the two scenarios. The analysis also demonstrated that all alternatives could continue to meet Compact requirements.

2.9 EIS SHOULD HAVE CONSIDERED INFRASTRUCTURE ADDITIONS/MODIFICATIONS

Summary Comment: Commenters disagree with DOI's decision to exclude some forms of infrastructure additions, or modifications, mainly involving temperature control of dam discharges or sediment augmentation below the dam, or with DOI's definition of sediment augmentation as an infrastructure addition or modification. Commenters stated that the DEIS dismissed any augmentation outright as deeming them economically unfeasible, request that DOI provide additional information as to the decision making process used to eliminate sediment augmentation from consideration because it is "infeasible," and note that no cost evaluation or studies were performed to determine whether the installation of temperature control devices would be an appropriate alternative to analyze. Options are available to deliver trapped sediment upstream of the dam downstream, to reposition bed-load sand to beaches and/or enhance supplies from the Paria, including the use of dredges. Dredging and beach building is not new infrastructure, but a possible alternative to HFEs that should be considered.

Response: As stated in Section 2.4.1, DOI considers any infrastructure modifications or additions to be outside the scope of the LTEMP EIS because they are currently economically infeasible and would require additional congressional authorizations (16 U.S.C. § 460l-19). However, the DOI does not rule out future new infrastructure if resource conditions warrant. Any infrastructure addition or modification would require additional time and study. Future potential infrastructure modifications would need to be evaluated in NEPA assessments (EAs or EISs) that fully considered the environmental impacts of construction and operation. These assessments and the construction of the infrastructure would necessarily result in some delay from the time of the LTEMP ROD and actual start of operation of the infrastructure. It could take as many as 10 years or more to evaluate and construct a TCD or sediment augmentation. Sediment augmentation was also determined to be outside the scope of the 1995 EIS. The EIS has demonstrated how the preferred alternative is designed to meet as many of the environmental conditions as possible as mandated by the GCPA.

The analysis for the EIS determined that under Alternative D, there would be a 152% increase in the sand load index (a measure of sandbar building potential) and a 47% decrease in the sand mass balance index, the lowest decrease of all the action alternatives.

Sediment is an important resource in the Grand Canyon and supports aquatic and riparian ecosystems, cultural resources, and recreation. Options for how to mitigate sediment impacts have been intensively studied for more than 20 years by the Grand Canyon Research and Monitoring Center (GCMRC) as well as by many academics and DOI bureau staff. Many options were considered throughout the LTEMP EIS process to address this problem. Options for

sediment augmentation were considered originally but after evaluation were considered economically infeasible at this time. Without augmentation, HFEs are considered the most feasible and potentially beneficial approach to building sandbars with the limited sand supply available downstream of Glen Canyon Dam.

2.10 ALTERNATIVE D IGNORES (OR DOES NOT MEET) HYDROPOWER OBJECTIVE

Summary Comment: Commenters state that the LTEMP EIS preferred alternative does not meet the renewable resource goal of NEPA Section 101 (b) 6 or the hydropower resource goal established by the DOI for the LTEMP EIS, that power production be "maintain[ed] (or/and) improve[d]," as stated in the Purpose and Need Statement (76 FR 129, July 6, 2011. Alternative D, places restrictions on the utilization of Glen Canyon Dam for hydropower production that are in addition to the restrictions that were established as a result of the 1996 Record of Decision (ROD). As a result, the renewable hydropower resource objectives of NEPA and the LTEMP EIS process will not be met if the preferred alternative is selected. In addition, low steady flow in July, August and September would result in a detrimental impact to hydropower production and would not meet the hydropower DFC objective.

Response: Hydropower production was one of the key resources thoroughly evaluated in the EIS. Many objectives and resource goals were considered in the LTEMP EIS. No one alternative was found which met all goals and objectives. Alternative D was identified as the preferred alternative because it met the purpose and need of the proposed action while achieving the best balance between downstream resource protection and hydropower production. It was the second best of the action alternatives in terms of hydropower performance.

DOI formulated the characteristics of the preferred alternative based on initial modeling of a set of 6 alternatives. There were several characteristics that were chosen to specifically reduce cost to the hydropower resource including increasing the fluctuation factor from 7 to 10 in high demand months, adjusting the monthly release pattern to match WAPA's Contract Rate of Delivery, increasing the volume of water in the high demand month of August from 750 to 800 kaf in 8.23 maf years, and eliminating steady flows after HFEs.

Note that the wording of the hydropower objective as presented in the EIS is "Maintain ***or*** increase Glen Canyon Dam electric energy generation, load following capability, and ramp rate capability, and minimize emissions and costs **to the greatest extent practicable, consistent with improvement and long-term sustainability of downstream resources** [emphasis added]." With this definition, all of the alternatives considered in the EIS satisfy the hydropower objective; however, the performance varies by alternative. It should be noted that Alternative D performed second best for hydropower out of all the action alternatives.

Several commenters provided letters addressing the role of hydropower in the purpose and need of this NEPA process. The joint leads feel the purpose and need as drafted reflects the appropriate role of hydropower given the authorities surrounding the operation of Glen Canyon Dam. In certain places we have edited the text to clarify the role of GCPA downstream resource priorities and hydropower. Water delivery and hydropower are fundamental principles that show

up as the first objectives of the LTEMP. The joint leads worked hard with the stakeholders to ensure representation of all interests. The GCPA is clear in its goals and the objectives that were outlined for the LTEMP reflect the goals of GCPA and the goals reflected in the "Law of the River". Please see the resource and objective goals outlined in the EIS.

2.11 EIS DID NOT CONSIDER A FULL RANGE OF ALTERNATIVES

Summary Comment: Commenters expressed disappointment that no alternative increased daily hydropower flexibility and expressed a desire to allow operation at full power plant capacity (with mitigation). Commenters disagreed with DOI's rationale for excluding the Full-Powerplant Capacity Operations Alternative - that it "would not meet the purpose, need, and objectives of the LTEMP including compliance with the GCPA."

Response: Contrary to statements in the comment, the LTEMP EIS did evaluate and present the results for an alternative that increased hydropower generation. Alternative B was originally crafted and submitted by CREDA, a power utility stakeholder. It has a greatly increased daily range compared to the No Action Alternative and it includes an experimental implementation of maximum powerplant capacity releases. This alternative showed a number of positive and negative impacts on a variety of resources as were disclosed in the EIS. The preferred alternative showed a better balance between resources to achieve the purpose and need of the proposed action.

As determined by the modeling conducted for Alternative B, a reduction in HFE frequency to no more than one every other year would reduce sandbar building with potential impacts on camping and riparian species. Implementation of full powerplant capacity operations ("hydropower improvement flows" of Alternative B) would have adverse impacts on a number of downstream resources including aquatic food base, native fish, riparian vegetation, wildlife, cultural resources, and recreation.

Regarding the "Full-Powerplant Capacity Operations Alternative", as explained in the EIS (see Section 2.3.10), this alternative was rejected because fluctuation levels to the degree proposed would have adverse impacts on many downstream resources and would not meet the purpose, need, and objectives of the LTEMP including compliance with the GCPA. However Alternative B described in Section 2.3.2 and analyzed in Chapter 4 includes a test of "hydropower improvement flows" that featured wide daily fluctuations (up to 20,000 cfs in some years and months).

Full powerplant capacity operations were considered and eliminated as an alternative as discussed in Section 2.3.10 because fluctuation levels to the degree proposed would have adverse impacts on many downstream resources and would not meet the purpose and need for this EIS. Alternative B was originally crafted and submitted by CREDA, a power utility stakeholder. It has a greatly increased daily range compared to the No Action Alternative and it includes an experimental implementation of maximum powerplant capacity releases. This alternative showed a number of positive and negative impacts on a variety of resources as were disclosed in the DEIS. The preferred alternative showed a better balance between resources to achieve the purpose and need.

The EIS presented an analysis of historical hydrographs to determine how the alternatives would perform under the drier conditions of climate change conditions, and found that, although the resource impacts under climate change would be different from those under historic hydrology, the relative performance of alternatives would be consistent relative to each other. This indicated that Alternative D would continue to be the best of the alternatives under conditions resulting from climate change.

2.12 FLOWS SHOULD NOT DROP BELOW 8,000 CFS

Summary Comment: Commercial rafters note that it is critical to their operations and public safety that the actual, not mean, daily minimum flow never drops below 8000cfs. Minimum flows of 5000 cfs from 7pm-7am for Alternative D indicated in Table 2.1 (page 2-9) are inadequate and dangerous. Navigational safety for boating is compromised when actual flows drop below 8000 cfs due to exposed rocks and increased difficulty in navigating the channel. Further, rafters are concerned with the minimum water level over the entire 24-hour day period; water released overnight will have an effect on many boaters downstream in the subsequent daytime hours. Also, low flow minimums below that of the 8,000 cfs level will restrict the time off-river by slowing the on-river pace and in turn diminish the overall experience for the visitor.

Response: Under the No Action Alternative, current minimum releases from the dam are set at 8,000 cfs from 7 am to 7 pm and 5,000 cfs from 7 pm to 7 am. This flow pattern, averaging a minimum over 24 hours of 6,500 cfs, has been in place since the 1996 Record of Decision was signed. Lower flows travel at a slower rate of speed and flows attenuate as the water moves downstream. The current minimums that have been in place for 20 years would be continued under the preferred alternative. Additionally, monthly volumes in the preferred alternative represent a relatively even pattern, allowing for more predictable and stable flow patterns throughout the year, including the high visitation summer months.

The EIS evaluates impacts on recreation related to navigation, fluctuations, and safety. These evaluations considered the minimum flow during each 24-hr period and the maximum daily fluctuation of each alternative. The preferred alternative is very similar to the No Action Alternative with regard to navigation, fluctuation level, and safety. As for all experiments, the implementation of low summer flows, TMFs, and macroinvertebrate production flows would take into account unacceptable adverse impacts on key resources including recreation. If unacceptable adverse impacts on key resources were anticipated, the minimum flow for both of these experiments could be adjusted.

The EIS acknowledges that low flows would reduce the amount of time boaters could spend off river, and assesses the impacts of each alternative using a “time off river“ index. The preferred alternative is expected to result in a very small decrease (<2%) in this index relative to the No Action Alternative.

2.13 8,000 CFS FLUCTUATION LIMIT

Summary Comment: Many commenters expressed a preference to keep daily water release fluctuations capped at 8,000 cfs, stating that this will help preserve natural resources that provide habitat for endangered fish and the re-building of beaches along the Colorado River. High fluctuations, some also note, can diminish or reverse some of the benefits of the HFEs and make it very difficult on river rafters and guides as they manage and plan river trips and manage boats on the shoreline. Other commenters support removing the 8,000 cfs cap, stating that it is unsupported by the scientific literature and restricts the hydropower resource without regard to CRSPA provisions to the contrary, and that DOI has failed to show that it benefits other resources.

Response: Alternative B was originally crafted and submitted by CREDA, a power utility stakeholder. It has a greatly increased daily range compared to the No Action Alternative and it includes an experimental implementation of maximum powerplant capacity releases. This alternative showed a number of positive and negative impacts on a variety of resources as were disclosed in the EIS. The preferred alternative showed a better balance between resources to achieve the purpose and need of the proposed action.

The 8,000 cfs maximum daily fluctuation cap that is currently in place has been in place since 1996. The cap is present in both No Action and the preferred alternative. It was put in place in 1996 to address safety, recreation and sediment concerns. The LTEMP EIS analysis has found that the same concerns still apply. The 8,000 cfs maximum daily fluctuation is based on the 1995 Bishop study, which was reviewed by DOI experts and found to still be the best available information and appropriate for this EIS. The Bishop study surveyed both the river guides and the general public regarding preferences and the river guides reported a preference for a maximum of 8,000 cfs daily change for a "tolerable recreation experience" under relatively high average daily flows. See Appendix J, where table J-1 has been updated to show the survey responses at a range of flow levels The 8,000 cfs maximum daily fluctuation in the preferred alternative is consistent with the over 1,000 comment letters received from river guides and members of conservation groups on the DEIS specifically stating the preference for retaining the 8,000 cfs maximum daily fluctuation in the preferred alternative that is currently in place for No Action.

Implementation of full powerplant capacity operations ("hydropower improvement flows" of Alternative B) would have adverse impacts on a number of downstream resources including aquatic food base, native fish, riparian vegetation, wildlife, cultural resources, and recreation.

The increases in fluctuation described in comments were analyzed in the document in association with various alternatives and showed a number of positive and negative impacts to resources that led to those other alternatives not being identified as the preferred alternative. The preferred alternative performed the best with the fluctuation levels it currently has to address the concerns of endangered species, sediment, hydropower and other related resources.

Modeling also indicated that the higher fluctuation levels under Alternative B or E would result in a number of adverse impacts including impacts on sediment, aquatic food base, vegetation, and recreation.

2.14 EIS DID NOT ADEQUATELY CONSIDER THE EFFECTS OF CLIMATE CHANGE

Summary Comment: Commenters expressed that the DEIS fails to take climate change seriously, fails to analyze the impacts on the water supply system of climate change for the entire Colorado River including the ecology in the Grand Canyon due to the operation of Glen Canyon Dam and Lake Powell, fails to analyze the likelihood of a "Compact Call" on the Colorado River due to the water lost by evaporation and seepage due to the operation of Glen Canyon Dam and Lake Powell, and fails to analyze a full range of alternatives that should be considered due to climate change including the decommissioning of Glen Canyon Dam and the draining of Lake Powell, stating that the criteria used to eliminate these alternatives would be obsolete in the face of catastrophic reductions in Colorado River flows caused by climate change, while none of the current alternatives would be viable under such conditions.

Response: The LTEMP utilized the best available science provided through the peer reviewed Basin Study (Reclamation 2012) regarding climate change projections in the Colorado River. The hydrological traces generated for the Basin Study were utilized as described in Section 4.16.1 and Appendix C.

This EIS used 21 reconstructed historical hydrological traces that were reweighted based on the 112 climate change traces to represent the best current understanding of what might happen under the drier conditions of climate change. Based on this analysis, the weights on the hydrological traces had a small effect on the aggregate performance but did not change the rankings of alternatives. This result suggests the relative performance of the alternatives would be consistent regardless of the uncertainty of the effects of climate change, and that Alternative D would continue to be the best of the alternatives under a changed climate.

The LTEMP team developed a set of alternatives that represented the full range of reasonable experimental and management actions; met the purpose, need, and objectives of the proposed action; and were considered within the constraints of existing laws, regulations, and existing decisions and agreements. Other alternatives such as decommissioning of Glen Canyon Dam, "Fill Mead First" and "Run-of-the River" proposals were not included in the EIS because they would not meet the purpose, need, or objectives of the proposed action (see Sections 2.3.8, 2.3.9 and 2.3.10). These alternatives would not allow compliance with water delivery requirements including the Law of the River and 2007 Interim Guidelines (Reclamation 2007a,b), and would not comply with other federal requirements and regulations, including the GCPA. The performance of these alternatives under climate change during the 20-year LTEMP period was discussed in Section 4.16.2.

Regarding whether the annual volume of water moving from the Upper Colorado River Basin to the Lower Colorado River Basin should be changed for the purpose climate change considerations, annual volume determinations are presently implemented through LROC as currently implemented through the 2007 Interim Guidelines. Consistent with the GCPA, and the purpose and need for this proposed action, any changes to annual volume determinations are beyond the scope of this NEPA analysis. Accordingly, the Proposed Action in the draft EIS does not require the Federal agencies (NPS and BOR) to either create a plan for providing water to the

Colorado River in Grand Canyon during extended drought periods or develop a basin wide plan for the operations of all dams.

The Basin Study (Reclamation 2012) was peer reviewed and is the best available science regarding climate change projections in the Colorado River Study. The hydrological traces generated for the Basin Study were utilized as described in Section 4.16.1.2 and Appendix C. This EIS did not model the 112 climate change hydrologic traces generated as part of the Basin Study due to insufficient data to drive the complex suite of models. We used 21 reconstructed historical hydrological traces that were reweighted based on the 112 climate change traces to represent the best current understanding of what might happen because of climate change. Based on this analysis, the weights on the hydrological traces had a small effect on the aggregate performance but did not change the rankings of alternatives. This result suggests the alternatives are robust to uncertainty about climate change.

By utilizing historic hydrology information and climate change-weighted hydrology information, we evaluated the effects of alternative operations over the 20-year LTEMP period under a wide-range of hydrologic and sediment conditions. We used a complete set of integrated models to evaluate effects of these changes in hydrology and sediment on the full range of resources including aquatic resources, terrestrial vegetation and wildlife, endangered species, cultural resources, Tribal resources, recreation, and socioeconomics. We modeled scenarios where the pool elevation dropped below the estimated minimum power pool (3,490 ft) and the results showed that there was no significant difference in the relative performance of the alternatives (Section 4.2). As stated in Section 4.2.2 of the EIS, "For Lake Powell elevations, all alternatives show very similar percentages for elevations that are ≤3,490 ft. The percentage of traces ranges between 0 and 5 and remains relatively constant throughout the 20 year period." In addition, we looked at the cumulative impacts of LTEMP in combination with other past, present, and future projects. We determined that the alternatives were robust to projected climate change-related hydrologies and could operate within the constraints of each alternative over the 20-year LTEMP period.

2.15 GEOGRAPHIC SCOPE OF THE EIS

Summary Comment: One commenter stated that the DEIS fails to clearly distinguish between 1) the scope of the proposed activity, i.e., Colorado River Ecosystem, and 2) the area of impact associated with implementing any activity proposed under LTEMP, and that it is unclear why some resources are discussed beyond the specific geographic limitations of the Colorado River Ecosystem and other resources are not. The DEIS should remain consistent with the geographic scopes intended for the proposed activities and impacts identified throughout its discussions and analyses.

Response: The text of the EIS has been revised to better clarify the geographic scope (See Section 1.5.1). It should be noted that the areas of potential impact vary by resource by necessity to evaluate the impacts. For instance, the effects of dam operations on vegetation or sediment are much more limited geographically than the effects on air quality or hydropower. In the cumulative analysis section (4.17), the region of influence for each resource is defined in the second column of Table 4.17-2.

2.16 MONITORING TO SUPPORT ADAPTIVE MANAGEMENT

Summary Comment: Commenters on this issue requested that the lead agencies conduct long-term resource monitoring to support adaptive management and to measure progress toward achieving goals and desired future condition.

Response: Long-term-monitoring for adaptive management will continue under the LTEMP. GCMRC has developed a Science Plan for the LTEMP that will guide these monitoring activities.

2.17 INCLUDE A SUMMARY OF EXPERIMENTAL AND MANAGEMENT ACTIONS FOR THE RAINBOW TROUT FISHERY

Summary Comment: Commenters on this issue requested that the selected alternative and/or the Record of Decision include a summary of experimental and management actions that are proposed to benefit the Lees Ferry rainbow trout fishery.

Response: The FEIS includes descriptions of all experimental and management actions for the alternatives in Chapter 2. There is not a summary of trout related experiments for all alternatives in one section, however all aquatic resource experiments for Alternative D can be found in Table 2-9 and Section 2.2.4.6.

2.18 GLEN CANYON DAM SAFETY AND SECURITY

Summary Comment: A commenter stated that Reclamation's misrepresentation of the growing risks associated with GCDs operational safety, the security of its water storage and hydropower generation benefits, as well as threats to water quality, not only renders its suite of alternatives and assessments thereof, incomplete, but renders an injustice to the Colorado River society as a whole by denying the public a truthful and up-to-date assessment of the known risks associated with the continued operations of GCD and the implied benefits therein.

Response: It is not clear what safety risks this comment is referring to. Dam safety is a priority of the Bureau of Reclamation and is evaluated comprehensively through Reclamation's Dam Safety program on an -ongoing basis. These on-going evaluations are wholly independent of LTEMP and beyond the scope of this NEPA analysis. The co-lead agencies feel that this NEPA process takes a comprehensive "hard look" at the proposed action and alternatives that is fully consistent with NEPA.

2.19 EXPERIMENTAL UNCERTAINTY

Summary Comment: Commenters stated that the experimental framework included in Alternative D fails to provide any meaningful level of certainty, there is insufficient detail and information regarding experimental triggers, baselines, off-ramps, hypotheses, unacceptable adverse impact, and metrics to determine success, or adaptively managing under LTEMP, and

the framework vests sole discretion in the DOI to determine whether a given experiment will be conducted.

Response: Triggers for experiments are clearly articulated. For several fish experiments triggers were developed and defined through the consultation process with FWS with information provided from GCMRC another experts and cooperators. GCMRC also developed a science plan and will be intimately involved in the implementation of LTEMP experiments through the GCDAMP triennial budget process and on-going monitoring, evaluation and reporting. The Colorado River Ecosystem is a dynamic system with complex interactions and changing conditions from year to year. The preferred alternative established a balance between structure and flexibility for experimentation to be able to allow for adaptive management in response to both changing conditions and new information gathered from experimentation. The preferred alternative has a number of annual steps built into the process to coordinate with GCMRC, agencies and stakeholders to consider the conditions of the year and the appropriate experiments given those conditions. Triggers and 'off-ramps' are defined. The triggers for HFEs and LSFs are well defined. Many of the triggers for tools for fish management have intentionally been left to be more flexible in the EIS as those have been defined during the consultation process with the FWS and will be more clearly stated in the FEIS. Greater specificity regarding triggers for HFE implementation and humpback chub actions have been added to the EIS (Appendices O and P).

The implementation framework for Alternative D (Section 2.2.4.3 of the EIS) explicitly calls for the consideration of key resources when determining which experiments to conduct in any given year. The framework also establishes off-ramps that would identify when experiments should no longer be conducted due to unacceptable adverse impacts. As described in Section 2.2.4.4, DOI will also exercise a formal process of stakeholder engagement to ensure decisions are made with sufficient information regarding the condition and potential effects on important resources. GCMRC has developed a science plan that describes the information that will be gathered during implementation of the LTEMP, and how that information would be used in an adaptive management context. Appendix O includes information regarding triggers for fish actions.

2.20 IMPACTS ON BASIN FUND

Summary Comment: A commenter stated that impacts to the Upper Colorado River Basin Fund must be assessed and considered.

Response: In Section 4.13 and appendix K of this EIS there is extensive analysis of the revenues from Glen Canyon hydropower production contributing to the Basin Fund. There are other factors that affect the balance of the Basin Fund that are outside the scope of the actions analyzed in this EIS, however those would not vary by alternative so they were not analyzed in the LTEMP EIS.

2.21 DUE CONSIDERATION OF HYDROPOWER

Summary Comment: Commenters stated that the Department of Interior must balance numerous important, and often competing, factors in developing the final LTEMP. Commenters urged that due consideration and weight be given to the importance of hydropower in this process.

Response: Many objectives and resource goals were considered in the LTEMP EIS. Hydropower production was one of the key resources thoroughly evaluated in the EIS. No one alternative was found which met all goals and objectives. Alternative D performed the second best out of the action alternatives on the hydropower metrics while also meeting the purpose and need and providing the best balance of resource impacts to comply with the Grand Canyon Protection Act and protect, mitigate adverse impacts to, and improve downstream resources. The preferred alternative was identified as the best balance for meeting the purpose and need of the LTEMP EIS.

2.22 SUPPORT ALTERNATIVE F

Summary Comment: One commenter expressed a preference for Alternative F, seasonally adjusted steady flows, because it would mimic natural conditions, and thus improve tailwater temperature and sediment conditions and riparian ecosystems downstream. Peaking power provided by fluctuating flows could be replaced by utility scale photovoltaic solar power.

Response: Alternative D was chosen as the preferred alternative because it met the purpose and need of the proposed action while achieving the best balance between downstream resource protection and hydropower production. This analysis considered the means and costs of alternate sources of peaking capacity as applicable under the various LTEMP alternatives

3 AQUATIC ECOLOGY

3.1 ALTERNATIVES WILL NOT PROTECT COLORADO RIVER ECOSYSTEM

Summary Comment: Commenters noted that Bureau of Reclamation (BOR) and NPS are setting themselves up for failure by attempting to restore an entire ecosystem based on responses to sediment inputs, temperature, and power grid needs alone instead of basing Glen Canyon Dams hydrograph on historic flow magnitude, frequency, duration, timing, and rate of change. In addition, there is a growing body of evidence on life history adaptations that indicate that several species depend on very localized hydrological conditions for their survival and reproduction. The Colorado River Ecosystem is continually changing, and novel, unanticipated ecosystem developments occur nearly every year. Many environmental and economic uncertainties, both recognized and unknown, complicate future adaptive management of the Dam and the Colorado River Ecosystem. Ensuring flexibility and administrative responsiveness is essential. Also, contingency planning is needed on a regular (annual) basis to deal with surprise events or processes, such as the sudden eruption of non-native green sunfish in Glen Canyon in 2015. Other commenters stated that adaptive management is based on the strategy of not placing the entire ecosystem at risk to answer management questions. Many management questions should be explored through small-scale field experiments or through modeling, rather than subjecting the entire ecosystem to an experiment that might jeopardize component species or processes. Only in cases where whole-ecosystem experiments are known to work, should they be conducted (e.g., testing the impacts of springtime HFEs on fluvial geomorphology and river biota).

Response: The purpose and need for LTEMP clearly align with the Grand Canyon Protection Act, whose goal is “to protect, improve and mitigate adverse impacts to natural and cultural resources and visitor use for which both park units were established”. All alternatives, including the preferred alternative (Alternative D), have positive and negative impacts which are disclosed in the EIS analyses. The Colorado River Ecosystem is a dynamic system with complex interactions and changing conditions from year to year. The preferred alternative established a balance between structure and flexibility for experimentation to be able to allow for adaptive management in response to both changing conditions and new information gathered from experimentation. The preferred alternative has a number of annual steps built into the process to coordinate with GCMRC, agencies and stakeholders to consider the conditions of the year and the appropriate experiments given those conditions. The joint leads have concluded that Alternative D has more positives than negatives and provides the best balance to meet the purpose and need for this project and to comply with the Grand Canyon Protection Act and the Law of the River. For a summary of impacts among alternatives, see Table 2-14.

3.2 IMPACTS OF FALL HFEs ON FISH AND AQUATIC FOOD BASE

Summary Comment: A number of commenters believed that repeated/frequent fall HFEs may be adversely impacting the rainbow trout fishery and the aquatic food base. Others stated that HFEs should be either deferred or only conducted in the spring if the condition of trout or the food base in Lees Ferry is poor. Others stated that the effects of sediment-triggered fall HFEs on trout recruitment are uncertain, but fall HFEs are expected to have less effect on trout production than

spring HFEs. Some commenters believed that a connection could be made between three consecutive fall HFEs and an increase in brown trout recruitment. In addition, the Havasupai requested the development of a monitoring site to study the impacts from the backflow of the HFE into Havasu Creek as well as impacts on the endangered fish naturally occurring and introduced at this location.

Response: The effects of HFEs on aquatic resources were fully analyzed in Section 4.5. This section reports that fall HFEs have not been found to have negative impacts to the food base, to trout recruitment or to native or non-native fish generally. There is no evidence of the frequency of HFEs being related to brown trout recruitment. Prior to the implementation of any HFEs, there would consideration of conditions related to humpback chub, trout, and aquatic food base. The HFE implementation process includes meetings with the GCMRC, FWS, AZFGD and other partners to take into consideration annual conditions as well as any new information. If unacceptable adverse impacts are predicted or observed, then experiments may be discontinued or additional NEPA processes may be conducted.

DOI will discuss the idea of a Havasupai monitoring site near Havasu Creek with GCMRC to be considered in the science plan or the monitoring implementation details.

3.3 REDUCE NUMBER OF HFEs TO IMPROVE THE AQUATIC FOOD BASE

Summary Comment: Commenters expressed concern regarding the continuation and expansion of HFEs, both in terms of frequency and duration. HFEs scour and remove the aquatic food base resulting in the loss of the main food source for trout and downstream humpback chub. Studies suggest that it takes 1 to 1.5 years for the food base to recover to pre-HFE levels after any HFE event. This indicates that if HFEs are implemented one or more times annually, there will be little opportunity for the food base to recover which will increase stress on the endangered native fish. Therefore, any selected alternative should include no more than one HFE every other year.

Response: Flow effects (including HFEs) on the aquatic food base are discussed in Section 4.5.2.1, with a more detailed discussion in Section F.2.2.1 (Appendix F). Reducing the number of HFEs (e.g., no more than one HFE every other year) is not supported by the analysis presented in the EIS. As discussed in Section F.2.2.1 (Appendix F), repeated HFEs are expected to result in a more productive aquatic food base. Such results do not occur from infrequent HFEs. Nevertheless, the HFE‘s are experimental in nature and allow for some adaptation over time based on results within the bounds of environmental compliance. If the HFEs cause unacceptable adverse impacts, there is a process defined in the EIS to suspend the HFEs.

3.4 IMPACTS OF MINIMUM FLOWS BEFORE AND AFTER HFEs

Summary Comment: Several commenters support the idea of keeping flows low and stable before and after HFEs. The health of the rainbow trout fishery and the aquatic food base, water temperatures, and dissolved oxygen levels should all be considered when determining the minimum flow that will precede and/or follow a fall high flow experiment (HFE). In general,

flows below 8000 cfs should be avoided if the condition of trout or food base is poor, water temperatures are above average, and dissolved oxygen levels are below average

Response: The issues the commenter raises, the health of the rainbow trout fishery, the aquatic food base, water temperature, and dissolved oxygen levels would be considered as part of the assessment of resources listed in Section 2.2.4.3 that will be considered when determining the flows that would precede or follow an HFE. Though the LTEMP EIS analysis did not find that steady flows after fall HFEs present a risk to the humpback chub population, that experiment has been removed for a number of other reasons including that it would be difficult to measure the results.

3.5 PROVIDE ADDITIONAL INFORMATION ON MOST RECENT FALL HFEs

Summary Comment: Commenters requested the inclusion of results from the recent HFEs (2012, 2013, and 2014) throughout the LTEMP DEIS including the portion of Section of 4.5 which addresses flow effects on benthic invertebrates. Given the impact to the endangered species, hydroelectric capacity and environmental ramifications of purchased power to replace the effects of HFEs; the failure of the DEIS to include and consider all of the HFEs and the cumulative impacts represents a significant analytical flaw. In addition, the DEIS fails to, but must include an analysis of the results of the 2013 and 2014 HFEs on rainbow trout recruitment and humpback chub.

Response: Preliminary results of the more recent HFEs have been added to Sections 3.5 and 4.5 of the EIS.

3.6 SUPPORT CAREFUL TESTING OF TMFs

Summary Comment: A number of commenters support the careful testing trout management flows (TMF), but only when there is an identified need to reduce the number of young of the year rainbow trout in Lees Ferry; while recognizing Tribal opposition to TMFs. A TMF should only be tested if AZGFD is in agreement that the trout population can withstand a potentially very successful TMF experiment that eliminates a recruitment year class. Testing TMFs when young trout are not abundant may adversely affect the Lees Ferry trout fishery, is contrary to the "condition dependent" adaptive management approach, and may not lead to conclusive results on the effectiveness of TMFs as a management tool.

Response: The DOI considers TMFs as an important tool for minimizing risk to downstream endangered fish from trout regardless of the cause of trout population increases or migration. Text has been added to Section 2.2.4.6 to clarify that implementation of TMFs would consider resource condition assessments and resource concerns. Early tests of TMFs would be used to determine the effectiveness of TMFs and a best approach to trout management. TMFs may not be tested when there appears to be the potential for unacceptable adverse impacts to specific resources such as humpback chub. Triggers for the implementation of TMFs would be developed in consultation with the AZGFD and other stakeholders to determine the implementation based on resource conditions in the given year. For Alternative D (the preferred alternative), trout

management flows are triggered by the prediction of high recruitment of young-of-year trout regardless of the cause of trout population increases or migration.

Based on the best available information, extensive modeling and extensive dialog with subject matter experts, the joint leads believe there would be concerns associated with testing TMFs when the trout population and trout recruitment is too low as that might not provide the best conditions for testing this tool. The text in the EIS has been edited to reflect this concern. Experimentally, the best conditions for testing TMFs are when high trout recruitment is expected, such as during a high release volume/equalization year or after a spring HFE, however the conditions for both of these are somewhat unpredictable and infrequent. Also DOI recognizes the concern of several Tribes related to conducting TMFs and the concerns of trout fisherman about the status of the trout fishery when TMFs are tested. DOI has designed the process for experiments to include a detailed evaluation of the resource conditions for the year and an extensive coordination process to hear from Tribes, agencies and the AMWG stakeholders about the concerns present at the time of implementing the experiments

3.7 QUAGGA MUSSELS

Summary Comment: A few commenters expressed concern that a potential infestation of quagga mussels below Glen Canyon Dam will have an adverse environmental impact. Because of the range of alternatives were developed before quagga mussel infestation occurred, it will be critical to study how best to mitigate the environmental damage it may cause. It was believed that there is a high probability that quagga mussels will change the food base chain and conflict with the proposed need for low summer flows to improve the aquatic food base. It is unclear what will happen to productivity in the Glen Canyon Reach if organic matter is reduced as a result of quagga mussels becoming established in Lee‘s Ferry.

Response: Quagga mussels continue to be found in the Colorado River below Glen Canyon Dam. Their distribution is patchy and highly influenced by location-specific flow regimes. While the potential impact from quagga mussels is uncertain, their management is beyond the scope of the EIS. If required, they would be managed through other actions conducted by the NPS. The Kennedy (2007) report cited in the EIS points out that negative ecological impacts appear to be low and that moderate densities of quagga mussels may increase food available to fish, increase the complexity of habitat and stimulate additional benthic production. (A link to the report can be found at http://pubs.usgs.gov/of/2007/1085/.)

3.8 PROVIDE ADDITIONAL/UPDATED INFORMATION ON AQUATIC RESOURCES AND SPECIES

Summary Comment: Several commenters wanted to see additional or updated information on a particular aquatic resource or species. These included wanting the EIS to provide more recent information regarding the status of razorback suckers in Lake Mead and the Lower Grand Canyon. Another commenter wanted the EIS to include the most recent data on brown trout recruitment in the Lee’s Ferry section of the Colorado River. One commenter requested that the connection between mayflies, stoneflies and caddisflies and the fish community be more

thoroughly addressed. Another commenter was concerned about predation of larval humpback chub by juvenile and adult humpback chub, as this could be a significant factor in year-to-year recruitment. One commenter noted that to fulfill the requirements of the Endangered Species Act, the best scientific and commercial data available needs to be used.

Response: The assessment of potential impacts from LTEMP activities on aquatic resources and species in the EIS is based on an extensive review of the scientific literature and other available data; as well as input from federal and state agencies (including the FWS and AZGFD) and other interested stakeholders. Recent literature and information on the aquatic resources and species made available since publication of the DEIS has been incorporated into the EIS. In regards to listed fish species, the recently completed Biological Assessment (BA) for the LTEMP is included as Appendix 0 of the EIS. The aquatic ecology sections (Sections 3.5 and 4.5) have been modified to include information from the BA.

3.9 AZGFD MANAGEMENT PLAN

Summary Comment: Commenter wanted information added describing the Arizona Game and Fish Departments Fisheries Management Plan, Colorado River-Lees Ferry 2015-2025 (Rogers 2015). The plan includes implementing actions that may be considered ongoing actions. The AZGFD refined the goals and objectives for the Lees Ferry Fishery in that plan. The purpose of the plan was to set measurable goals and identify several strategies to reach these goals. This differs from the NPS comprehensive fisheries management plan which focused on stocking triggers for Lees Ferry in the event the fishery returned to conditions prior to MLFF where it was primarily supported by stocking. A key concern which is addressed in the AZGFD plan, and not in the NPS comprehensive fish management plan, is the definition and response to a catastrophic loss of the fishery. The AZGFD plan is a proactive approach that aligns with the NPS Comprehensive Fisheries Management Plan that seeks to avoid a catastrophic loss and to ensure that the highly valued recreational trout fishery is sustained or enhanced while minimizing impacts to humpback chub.

Response: The AZGFD management plan and NPS's Comprehensive Fisheries Management Plan are independent of the LTEMP EIS. Currently, there are aspects of the AZGFD plan that are not in agreement with the LTEMP or with the Comprehensive Fisheries Management Plan. These issues include HFEs triggered by dissolved oxygen conditions or trout population levels, and details related to stocking conditions. Because of these differences, at this time, the joint leads cannot include these objectives or reference this plan in its current form because several of the actions in the plan do not meet the purpose and need of the LTEMP or do not agree with the Comprehensive Fisheries Management Plan. The NPS is continuing to work with AZGFD to work toward agreement on these concerns.

4 CULTURAL RESOURCES

4.1 APPLICABILITY AND COMPOSITION OF CULTURAL RESOURCE METRICS

4.1.1 Wind Transport

Summary Comment: Commenters expressed concern with how effectively this metric captures the potential for wind transported sediment to help preserve archaeological sites along the Colorado River. The comments ranged from requests to remove the metric from the analysis to clarifications on how the components of the metric were developed.

Response: The text in the EIS was updated to include the results of several recently published studies on the extent and range that wind transported sediment can be distributed. The text was also modified to indicate that some Tribal members may not consider the reburial of sites by wind transported sediment to be a positive effect.

4.1.2 Time Off River

Summary Comment: Commenters expressed that the time-off-river metric, a measure of the time available to rafters for shore exploration during river trips and a function of river flow levels, is a poor measure of potential impacts on archaeological sites and should not play an important role in the EIS analyses. Commenters noted that while the metric is a logical construct, there is no evidence that more time off river leads to greater visitation because visitors have many other options for exploration and, further, that respectful visitation of Class I sites is actually expected and encouraged.

Response: In the cultural section, 4.8, this metric is presented as a **potential** for increased effects, rather than as a direct link to increased effects, because the monitoring of these sites which NPS has performed over the last 20 years has not shown a strong correlation or a cause and effect relationship. The metric was developed in response to concerns from the Tribes who have noted negative effects at archaeological sites due to visitors and their observations that additional time off river allows for boating parties to spend more time hiking and visiting sites. The value of the metric for cultural resources varied little among the LTEMP alternatives as noted in Section 4.8.

In the recreation analysis in Section 4.11, this metric measures the potential effects of alternate flow regimes on recreation and therefore is the most pertinent means of evaluating the LTEMP alternatives with respect to effects on recreation. In the recreation analysis, more time-off-river was considered a positive for recreation as it was used to "evaluate the opportunity for onshore exploration." The value of the metric varied little among the LTEMP alternatives (Figure 4.10-1), and thus had little value in differentiating them as noted in Section 4.11.2.

4.1.3 Glen Canyon Flow Effect Metric

Comment Summary: Commenters raised concerns with the choice of Ninemile Terrace as a proxy for other historic properties in GCNRA and also questioned the effectiveness of the metric as a predictor of erosion at archaeological sites in GCNRA because of a lack of direct studies on this topic.

Response: Text was added in Appendix H to further clarify why Ninemile Terrace is an effective proxy for other archaeological sites in GCNRA. The components of the metric are based on direct observations of effects from past HFEs on the terrace.

4.2 AREA OF POTENTIAL EFFECTS

Request disclosure on how APE was determined. Do not support the rim to rim application of the APE.

Summary Comment: Several commenters inquired about the Area of Potential Effect (APE) for the Section 106 of the National Historic Preservation Act review for LTEMP. The DEIS contained general language on this topic as consultation was on going when the DEIS was issued. Specifically they were seeking information on how the APE was determined and which historic properties were being included. There was a commenter who disagreed with defining the APE to include all historic properties within the canyon.

Response: Text in Chapters 3 and 4 has been updated to explain the differences between the analysis of potential effects between NEPA and NHPA Section 106. Reclamation and the NPS are developing a new programmatic agreement for the NHPA Section 106 process and to help guide management of cultural resources along the Colorado River. These consultations are on-going. Once the Cultural Programmatic Agreement is complete the information on the APE will be provided to the public.

4.3 LANDMARK STATUS FOR GRAND CANYON AND ITS RESOURCES

Summary Comment: Comments were received suggesting that the cultural resources found within the Grand Canyon warrant consideration as a National Historic Landmark and that nomination of the resources as a National Historic Landmark begin soon.

Response: The NPS is continuing consultations with the Tribes concerning future nominations for listing of resource in the National Register of Historic Places. However, the nomination of the canyon as a National Historic Landmark is beyond the scope of the LTEMP EIS.

5 CUMULATIVE IMPACTS

5.1 ADDITIONAL FORESEEABLE ACTIONS (INCLUDING MANAGEMENT PLANS) TO BE INCLUDED

Summary Comment: Commenters requested that additional foreseeable actions be included in the cumulative impacts analysis. Among them were the MLFF alternative (1996 ROD), releases of contaminated water into Lake Powell (related to mines), the AZGFD fisheries management plan, and the Flaming Gorge Dam and Aspinall Unit EISs.

Response: The cumulative impacts analysis was revised to include the additional foreseeable actions as requested and to account for the effects of these actions on various resources, as warranted.

5.2 REFINEMENT OF DESCRIPTION AND/OR IMPACT ASSESSMENT FOR FORESEEABLE ACTIONS CONSIDERED

Summary Comment: Commenters requested revisions to modify or update the descriptions of foreseeable actions identified; e.g., to flesh out the implications of the 2007 Guidelines to water resources or to update the status of the Clean Power Plan proposed rule. Other requests pertained to defining terms (e.g., the region of influence or the term "future projects"). Commenters also requested that descriptions of power plants (Four Corners and San Juan Generating Station), listed as foreseeable actions, be revised to reflect the current and scheduled modifications at those plants and that the implications of these changes to regional hydropower generation be addressed.

Response: The cumulative impacts analysis was revised to update descriptions of foreseeable actions and to account for the effect of these changes on water resources and hydropower, as warranted. Definitions of terms such as "region of influence" and "future projects" were added in Section 4.17.

6 HYDROPOWER

6.1 SCOPE OF ANALYSIS AND STUDY ELEMENTS

6.1.1 Hydropower Goals and Objectives

Summary Comment: Hydropower goal and objectives are not clear and use conflicting language in the various sections of the report.

Response: Text has been revised to make consistent throughout EIS.

6.1.2 Generation at Hoover Dam

Summary Comment: Analysis of changes in generation at Hoover Dam is beyond the scope of LTEMP because Hoover and Glen Canyon are statutorily separate.

Response: Although Glen and Hoover are statutorily separate and effect different entities, the power systems economic analysis focuses on power production costs and capacity expansion related expenditures for the grid as a whole not on the financial impacts for specific entities. Economic impacts on Lake Mead and Hoover Dam are the result of changes in monthly water release patterns from Lake Powell. These changes to impacts on power economics have been identified and therefore were included in the FEIS.

6.1.3 Cumulative Impacts on Power Systems

Summary Comment: Cumulative impacts on power systems were not adequately addressed.

Response: Text has been added to the EIS to address this concern in Section 4.17.

6.1.4 Analysis of Impacts on Basin Fund

Summary Comment: The impacts on Upper Colorado Basin Fund, cash flow and its ability to fund important research should be studied in more detail.

Response: Section 3.13.1.2 includes a description of the Basin Fund and states “Most of the revenues come from sales of hydroelectric power and transmission service.” This EIS did analyze revenues from Glen Canyon hydropower production and their contribution to the Basin Fund. See the extensive hydropower analysis in 4.13 and Appendix K. There are other factors that affect the balance of the Basin Fund; however, they are outside the scope of the actions analyzed in the LTEMP EIS and would not be affected by the LTEMP alternatives. It should also be noted that consideration of unacceptable adverse impacts on the Basin Fund is one of the considerations included in Section 2.2.4.3 as part of the implementation process for experiments that may affect hydropower.

6.1.5 Consideration of Impacts on Basin Fund

Summary Comment: Impact on Upper Colorado Basin Fund should be a secondary consideration when selecting a preferred alternative.

Response: DOI considers the Upper Basin Fund important to the LTEMP given its role in funding environmental activities. Consideration of unacceptable adverse impacts on the Basin Fund is one of the considerations included in Section 2.2.4.3 as part of the implementation process for experiments.

6.1.6 Power System Impacts on Climate Change

Summary Comment: Potential climate change impacts on LTEMP alternatives were not incorporated in the power systems analysis.

Response: Climate change effects on hydropower generation results are presented in Section 4.16.3. The LTEMP climate change analysis was based on the Basin Study (Reclamation 2012), which was peer reviewed and is the best available science regarding climate change projections in the Colorado River Study. The hydrological traces generated for the Basin Study were utilized as described in Section 4.16.1.2 and Appendix C. The Basin Study used 112 climate change hydrologic traces generated as part of the Basin Study, however due to insufficient data to drive the complex suite of models, we used a subset of 21 traces out of the 112 for the LTEMP EIS. These 21 reconstructed historical hydrological traces were reweighted based on the 112 traces to represent the best current understanding of what might happen because of climate change. Based on this analysis, the weights on the hydrological traces had a small effect on the aggregate performance but did not change the rankings of alternatives. This result suggests the alternatives are robust to uncertainty about climate change.

6.1.7 Sensitivity Analysis of Fuel Prices

Summary Comment: A sensitivity analysis using a range of projected utility fuel prices should have been conducted because natural gas prices are currently very low.

Response: Text was added to the EIS text acknowledging the possible effects of the currently low natural gas prices on results.

6.1.8 Clean Powerplant Legislation

Summary Comment: Clean powerplant legislation was not considered in the analysis.

Response: Information about clean powerplant legislation is included in the cumulative impacts Section 4.17, but that legislation is currently in draft form. In February 2016 the Supreme Court ordered EPA to stop enforcement until a lower court rules on a lawsuit. A ruling on the lawsuit will most likely not come until after the 2016 presidential election and enforcement may depend upon the results of the election as well. Because specifics are unknown at this time and it may be

tied up in litigation for many years, it was not appropriate to analyze it further than this in this EIS.

6.2 GENERAL OVERARCHING COMMENTS ON THE POWER SYSTEMS ANALYSIS

6.2.1 Adequacy of Power Systems Analysis

Summary Comment: The analysis is strongly biased against hydropower resources, incomplete, and significantly underestimates costs in all cases using simplified models and metrics for hydropower resource rendering it inadequate.

Response: The commenter has provided no evidence to support these conclusions. Therefore, we have no basis to determine whether or not they are accurate. We do not believe that the analysis is biased against hydropower resources, is incomplete, or underestimates costs. LTEMP used economic measures that are consistent with the ones used in other Upper Colorado River Basin environmental studies. The level of technical detail that was used to support the computation of these measures has in general exceeded the ones used in other studies, some of which only applied the GTMax-lite model. For the LTEMP analysis we also used the AURORA model to explore grid-wide interactions. All major assumptions are both noted and documented and rely on publically available sources such as those published by the U.S. Energy Information Administration (EIA) and the Federal Energy Regulatory Commission. There were several sensitivity analyses included in Appendix K to explore possible additional sources of costs. In response to utility cooperator comments on the DEIS, an additional analysis was added to Appendix K looking at a different mix of powerplant replacement technologies which could result in a higher estimate of capacity replacement costs. The text in Chapter 4 Section 4.13 was also updated to include a summary of those sensitivity analyses.

6.2.2 Ratepayer Analysis Flawed

Summary Comment: The retail ratepayer analysis that was included within the draft LTEMP EIS report is flawed because the agencies that conducted the analysis do not provide retail electric service, do not deal with issues that are directly related to the provision of retail electric service, do not have expertise with respect to retail electric rate making, and did not consult with retail electric service providers such as SRP when conducting the analysis.

Response: Retail rate analyses were primarily conducted by Edward Bodmer who led retail electricity rate and utility financial viability analyses for Western's Electric Power Marketing EIS. He is an experienced financial consultant who develops complex corporate project finance and simulation models. He provides expert testimony on financial issues before regulatory agencies and has taught customized in-house courses for Shell Oil, General Electric, HSBC, Citibank, CIMB, Lindlakers, Saudi Aramco and many other energy and industrial clients around the world. He also worked for a regulatory commission and has testified approximately 40 times on rate making issues both from a financial perspective and a rate allocation perspective. The

rate impacts were reviewed by experts in the field who had no problems with the overall approach. Formerly, Bodmer was the Vice President at the First National Bank of Chicago, where he directed created financial modeling techniques used in advisory projects. With respect to the comment that we did not consult with entities such as SRP, this is simply incorrect. We received comments, letters and made presentations where ratemaking entities were present. In addition, we did extensive research on the financial structure of the entities and reviewed financial data in the context of rate setting. In addition, the ratepayer methodology and results report were peer reviewed by three independent reviewers as well as by GCMRC.

6.2.3 Inputs to Capital Costs Analysis

Summary Comment: Capital costs should have been supplied by CREDA members since they actually build new powerplants and entities such as Argonne and Energy and Environmental Economics, Inc. (E3) do not.

Response: LTEMP assumptions regarding the characteristics of all capacity expansion candidates including capital investment costs are noted and documented in K.1.6.2. These costs are based on Energy Information Administration (EIA) data that are used for the EIA Annual Energy Outlook. This section discusses these costs and compares these to other estimates including those used by Western Electricity Coordinating Council (WECC) and those supplied by CREDA for a previous Upper Colorado River Basin EIS. LTEMP hydropower analysts are both well qualified and have extensive experience in applying these costs for economic analyses. We note that a very similar approach that also used EIA data sources was used by E3 for a study conducted for WECC.

As stated in Chapter 4, Section 4.13.1 "The LTEMP hydropower resources impact analysis was largely an economic analysis rather than a financial analysis. A financial analysis focuses on the revenues and costs accrued by a particular entity, including transfer payments, such as power transactions, taxes, and insurance. It also includes payments made by individual entities for previous investments. In contrast, an economic analysis focuses on societal costs and benefits. Transfer payments among entities are excluded because the total net change to society of these transactions is zero; that is, the amount paid by the buying entity equals the amount received by the selling entity. Also excluded from economic costs are past investments, such as those to construct power plants, because these expenditures have already been incurred on society and cannot be recovered. Similar to other power systems EIS analyses performed by Argonne, the economic analysis performed for LTEMP estimates changes to the U.S. economy as the result of altering operating criteria at Glen Canyon Dam. These economic costs include expenditures to build and operate new capacity in the future to replace Glen Canyon Dam Powerplant lost capacity and both fuel and variable operation and maintenance (O&M) costs associated with altering the dispatch of Western Interconnection generating units. A financial analysis was performed for the LTEMP EIS to estimate the wholesale (see Section 4.13.1.2) and retail rate impacts (see Section 4.13.1.3) on individual affected entities (e.g., individual FES utilities and their retail customers)."

6.3 LEGAL ISSUES

6.3.1 HFEs as Part of Long-Term Operations

Summary Comment: Bypass releases associated with HFE's that are conducted on a routine basis as part of a long-term operational plan are inconsistent with the "Law of the River" and that have not been addressed from a legal perspective.

Response: These releases are experimental and are being implemented in compliance with the Law of the River and specifically in compliance with laws related to the operations of Glen Canyon Dam. Experimental releases only change the monthly and hourly releases with annual volumes still complying with the LROC as currently implemented through the 2007 Interim Guidelines.

6.3.2 Irretrievable Loss of Hydropower

Summary Comment: Experiments cause an irretrievable loss of hydropower production, but there is no analysis included which would meet the requirement of 40 CFR 1506.1

Response: To the extent there is a loss of hydropower production in the future as a result of implementing the preferred alternative, this potential loss has been analyzed in the EIS. Analysis has been added to Section 4.17, and a discussion provided in Section 4.20.

6.4 TECHNICAL POWER SYSTEM ISSUES

6.4.1 Discount Rate

Summary Comment: Discount rate used in the analysis is too high and capital costs have not been escalated resulting in an underestimate of negative power impacts

Response: By policy, Reclamation is required to use the Principles and Guidelines (P&G) discount rate which is currently 3.375%. A rate of 1.4% was used in a sensitivity study, the results of which have been documented. Also, Reclamation P&Gs do not allow real capital cost escalation.

6.4.2 Capital Costs

Summary Comment: Capital costs are too low; all cost considerations for constructing a new generating plant were not included in developing capital and O&M costs.

Response: The economic cost to build a new generating unit (LTEMP costs) and the financial outlays that a utility incurs to build a new generating unit (CREDA costs) are fundamentally different. Utility outlays for taxes and insurance are excluded from an economic analysis because

these are transfer payments that are not part of the cost of construction. LTEMP did not include site specific costs that are advocated by CREDA because that level of detail is beyond a typical economic analysis for an EIS. It would be prohibitively time consuming and expensive to determine all possible sites for power plant replacement and all of the costs associated with those sites, and that level of analysis has never been performed for similar EIS documents on the Colorado River. EIA costs are based on typical values that we adjusted for broad regional construction costs considerations such as material and labor. In response to utility cooperator comments on the DEIS, an additional analysis was added to Appendix K looking at a different mix of powerplant replacement technologies which could result in a higher estimate of capacity replacement costs.

6.4.3 Exceedance Level

Summary Comment: There are concerns about exceedance level assumptions used to estimate firm Glen Canyon Dam Powerplant capacity.

Response: An analysis of Western's current marketing commitments shows that the assumption of 90% exceedance level used in the LTEMP EIS is consistent with their marketing planning assumptions. A 90% exceedance level means that there is up to a 10% risk of those commitments not being met in a given year. To address these concerns about future marketing commitment levels, a sensitivity study was performed on 50%, 90%, and 99% exceedance levels. Results are shown in Appendix K.1.10.4 and summarized in Chapter 4.13. These results generally conclude that lost Glen Canyon Dam powerplant capacity under all alternatives except for Alternative B have the highest capacity loss at the 50% exceedance level that progressively decreases through the 99% exceedance level (see Figure K.1-32 in Appendix K). We therefore performed an economic cost sensitivity analysis on these two levels to quantify reasonable cost "bookends."

6.4.4 Ancillary Service Assumptions

Summary Comment: There are concerns about ancillary service assumptions.

Response: Cooperators were concerned that using a lower ancillary service requirement could significantly affect Glen Canyon Dam dispatch, firm capacity levels, and economic evaluations. A simplified sensitivity analysis was therefore performed to gain a general appreciation for the impact of ancillary service assumptions on model outcomes. The analysis was performed on Alternatives A, D, and F under two disparate ancillary service market assumptions. Results should that difference in the combined net present value of capacity and energy was 0.14% or less. Under all cases, this small economic difference was primarily due to the existence of significant levels of "unused" Glen Canyon Dam Powerplant capacity which could be used to fulfill ancillary service obligations. This analysis is documented in Appendix K.1.10.8.

6.4.5 Modeling Assumptions

Summary Comment: There were questions about the modeling assumptions regarding locational marginal prices (LMP) responses to changes operations at Glen Canyon Dam and the Western Electricity Coordinating Council study (WECCi-leaks study).

Response: Text has been edited for clarity and both figures and reference to the WECCi Leaks study have been removed as it was not used as part of the LTEMP analysis.

6.4.6 Small Customer Representation

Summary Comment: The representation of small customers is unrealistic and flawed. Small customers are more limited in their choices of suppliers due to transmission and resources and do not have the financial resources or the load to build new facilities to replace capacity and energy losses.

Response: The representation of small customers is neither unrealistic nor flawed. For the power systems analysis (both expansion and dispatch modeling), we aggregated the small customers together for precisely the reasons outlined in the comment; namely, that small customers could not build their own facilities and are dependent upon other suppliers and power purchase agreements.

6.4.7 Small Customer Loads and Load Growth

Summary Comment: The representation of small customer loads and load growth rates are incorrect.

Response: Small customer load assumptions and simplifications are fully explained and disclosed. Because hourly generation levels were not readily available from publically available sources, we used normalized load profiles from other entities as approximations. Normalized load profiles express loads in terms of a fraction of the peak load such that the peak load is set equal to 1.000 and all other loads are less than 1.000 (i.e., hourly load/peak load). These load shapes were scaled to match estimated historical total load based on information that was collected for the retail rate 40 payer analyses. For example, the UAMPS normalized load profile was used to represent small customers in the west. It was selected because most of the 44 UAMPS members are small municipal systems that serve small to medium cities and towns that have attributes which are similar to many of WAPA's small customers. We judged that this modeling approach produces a reasonable approximation of aggregate small customer loads. In addition, errors occur equally under all alternatives and therefore probably have minimal effects on the comparative results.

6.4.8 System Expansion Plan

Summary Comment: Assumptions regarding a cooperative SLCA/IP system-wide expansion plan are overly simplistic and results in an underestimate of power impacts.

Response: Text revisions have been made for clarification. Power impacts have not been underestimated because this level of modeling and simplification is consistent with and improves upon previous EISs conducted for Glen Canyon Dam, such as the 2007 interim guidelines. Due to the complex nature of the grid, all power systems models with scopes that cover a large geographical area over a multiple year time span, such as the one conducted in support of LTEMP, need to make simplifying assumptions in order for the problem to be tractable. For LTEMP we tailored models and methods to meet study objectives; that are to rank alternatives in terms of economic costs and to gain an appreciation for relative costs among alternatives. As detailed in Appendix K, we performed sensitivity analyses on several key modeling assumptions to learn about the effect of these assumptions on model results and to obtain a reasonable estimate of potential outcomes. We also applied methods and models, such as AURORA, that were more detailed than those used for previous EIS's conducted on power facilities in the Colorado River Basin. We observed that the ranking are very robust changing little as a function of modeling assumptions. We also observed the GTMax-lite model that strips away many of the modeling complexities embedded within AURORA lead to very similar alternative rankings. Thus, we made assumptions and implications at the level appropriate for this type of analysis and have fully disclosed those assumptions in the EIS. We also discussed the possible implications of this simplification of model results. The document also includes several examples of joint powerplant/unit ownerships that currently exist in the study region. The power analysis methods, assumptions and results have been peer reviewed by three external experts and the peer review results are available on the LTEMP website.

6.4.9 Transmission Constraints

Summary Comment: Transmission system constraints on power exchanges in the region should have been included in the analysis.

Response: Detailed transmission system constraints on power exchanges in the region were not explicitly modeled because it would have significantly increased the size and complexity of the problem and it was not expected to have a significant impact on comparative results among alternatives. It is also consistent with previous EISs conducted for Glen Canyon Dam that also did not explicitly represent the transmission system. We did however include on- and off-peak costs on AURORA modeled energy flows (i.e., power transactions) among customers based on average historical transmission rates. These costs tend to dampen bulk power transactions among energy trading entities. The end result was that AURORA estimated generation levels are very similar to historical levels by both fuel type and at the utility level. We have disclosed methodologies, assumptions, limitations and results which were peer reviewed. It is noted in the EIS that the WAPA contract rate of delivery (CROD) will be identical under all alternatives. If feasible, customers can utilize the CROD to schedule the delivery of both WAPA energy and other energy transactions up to the contractual limit.

6.4.10 Renewable Portfolio Standards

Summary Comment: SLCA/IP customers such as SRP are not required to comply with State Renewable Portfolio Standards (RPS).

Response: We acknowledge that RPSs are not required of all LTF customers. SRP and Tri-State do have an internal program to set a target for building significant amounts of renewable or sustainable resources.

6.4.11 Costs of HFEs

Summary Comment: Costs to conduct experiments such as HFEs are underestimated because trading partners would take advantage of Western's inflexible situation during experiments.

Response: We acknowledge that the prices that WAPA is offered from its trading partners during HFEs sometime depart from overall market prices. This has financial implications for WAPA. The power systems economic analysis does not consider these financial transactions because there are no system-level economic impacts. The savings gained by entities that purchase at below market prices are exactly offset by financial losses for entities that sell below market price. The net economic impact is therefore zero.

6.4.12 Costs of Experiments

Summary Comment: The costs to conduct experiments are too low and experiments such as low summer flow would have a devastating impact on power.

Response: The analysis shows that a low summer flow experiment would not significantly, if at all, change annual hydropower production during low summer flow years. There would be an economic impact however with a decrease in NPV between $13.93 million and $21.01 million. Low summer flows are projected to occur infrequently; under the preferred alternative, low summer flow would be expected to be tested once in the second 10 years of the LTEMP period.

6.4.13 Impacts of Macroinvertebrate Production Flows on Hydropower

Summary Comment: Macroinvertebrate production flows may cause serious negative impacts on power and should be conducted in a way that is least damaging to hydropower.

Response: After the DEIS was published, hydropower assumptions and the modeling of macroinvertebrate production flows were revised based on input from WAPA, the results of which show a positive benefit to hydropower capacity. Revised results are consistent with analyses conducted by WAPA regarding a positive net benefit to power.

6.4.14 Effects at Hoover Dam and Glen Canyon Dam

Summary Comment: Concerns were raised about potential perceptions regarding changes in higher Lake Mead elevations and Hoover powerplant "benefits" offsetting Glen Canyon Dam economic impacts.

Response: To address these concerns the description of Hoover Dam impacts were substantially revised. The FEIS no longer refers to changes in the NPV of Hoover as a "benefit" or as "offsetting" alternative costs at Glen Canyon. We also indicate that the economics of Hoover and Glen Canyon are not directly comparable because the analyses used different levels of modeling details. Instead we indicate that the Hoover analysis was performed primarily to disclose the general direction and relative magnitudes of Hoover impacts.

6.5 RETAIL RATE ANALYSIS

6.5.1 Consideration of Wholesale Rate Input

Summary Comment: Retail electric rates were computed without accounting for wholesale rate charged by Western

Response: Wholesale rates were not used because: (1) the wholesale rate study was completed after the retail rate analysis; (2) through directly using data from the power systems model the direct connection between power system costs and rate impacts could be observed and the process was transparent; (3) the capital cost of constructing new capacity incurred by utility systems (such as Tri-state) was directly estimated rather than assuming Western would carry the burden of replacing the capacity. In addition, modeling was peer reviewed by three independent reviewers as well by GCMRC.

6.6 WHOLESALE RATE ANALYSIS

6.6.1 Assumptions

Summary Comment: Concerns regarding the bookends marketing assumptions selected for the wholesale rate analysis

Response: Wholesale rate bookends were chosen because they were thought to represent a reasonable range for the marketing of SLCA/IP power in the post-2024 period and illustrate that the effect of the SLCA/IP rates from the LTEMP EIS alternatives are, in part, driven by sales of AHP energy and capacity.

6.7 EDITORIAL COMMENTS

Numerous substantive editorial comments were submitted on hydropower sections in the DEIS including Sections 3.13, 4.13, and Appendix K. Where appropriate, the text of the EIS was modified to address the specific comments.

7 NATURAL PROCESSES

7.1 NATURALLY PATTERNED FLOW AND RUN-OF-THE-RIVER FLOW ALTERNATIVES

Summary Comment: One commenter suggested that the LTEMP should improve habitats by attempting to recreate the shape of the historic hydrograph by generally increasing water levels until June followed by a gradual ramp down to a lower level between September and February, with a possible late summer spike to simulate late-summer monsoons. The daily fluctuations with dramatic step-ups and step-downs in flow that now occur almost never occurred before the dam was in place.

Response: "Naturally patterned flow" and "Run-of-the-river" alternatives were considered but dismissed in the draft EIS (see Sections 2.3.2, 2.3.11).

7.2 REMOVE NATURAL PROCESSES FROM THE EIS

Summary Comment: One commenter wanted natural processes deleted from the EIS.

Response: No text change made. The natural processes goal was based on several of the Desired Future Conditions (see Appendix A of the EIS) and on NPS management policy.

7.3 NATURAL RESOURCE PERFORMANCE GOAL

7.3.1 Quantitative Performance Metric

Summary Comment: Several commenters stated that a quantitative performance goal should have been established for natural processes, possibly comparing alternative flows with pre-dam flows.

Response: The best available science and models were used in this EIS. There was not adequate information to develop a quantitative performance metric for pre-dam versus post-dam conditions in a consistent manner to facilitate comparison across alternatives for natural processes.

7.3.2 Goal to Restore Is Not Achievable

Summary Comment: A few commenters wanted the following sentence deleted: "For the LTEMP, the analogous natural processes resource goal is to 'restore, to the extent practicable, ecological patterns and processes within their range of natural variability, including the natural abundance, diversity, and genetic and ecological integrity of the plant and animal species native to those ecosystems'." It is not possible to operate Glen Canyon Dam in a manner that could

fully restore natural processes and their drivers to those that occurred under unregulated conditions

Response: No text change made. The natural processes goal was based on several of the desired future conditions (see Appendix A of the EIS) and on NPS management policy. The EIS recognizes that management of dam operations and any subsequent effects on natural processes may not act to fully restore natural resources in the system. Rather, the EIS compares alternatives with regard to how alternative-specific temperature, flow, and sediment conditions may affect processes that depend on these conditions, and possible subsequent responses in natural resources, including not only maintenance of native biota in their current conditions, but also enhance or improve habitats and thus benefit associated biota.

7.3.3 National Park Service Natural Processes Management Policy and Goals

Summary Comment: One commenter noted that an important objective of management of the Colorado River Ecosystem is the ability to sustain healthy populations of native plants and animals and natural ecological processes. NPS management policies state that (1) "whenever possible, natural processes will be relied upon to maintain native plants and animals and influence natural fluctuations in populations of these species" and (2) "the Service ... will try to maintain all components and processes of naturally evolving park ecosystems, including the natural abundance, diversity, and genetic and ecological integrity of the plant and animal species native to those ecosystems" (NPS 2006b). For the LTEMP, the analogous natural processes resource goal is to "restore, to the extent practicable, ecological patterns and processes within their range of natural variability, including the natural abundance, diversity, and genetic and ecological integrity of the plant and animal species native to those ecosystems." It is not possible to operate Glen Canyon Dam in a manner that could fully restore natural processes and their drivers to those that occurred under unregulated conditions." Since management policies are not dictum; why can they not be changed? The commenter further states that statements such as "rely on natural processes" and "try to maintain" are much different from "restore".

Response: Changing NPS Policy is outside the scope of the EIS. The EIS recognizes that management of dam operations and any subsequent effects on natural processes may not act to fully restore natural resources in the system. Rather, the EIS compares alternatives with regard to how alternative-specific temperature, flow, and sediment conditions may affect processes that depend on these conditions, and possible subsequent responses in natural resources, including not only maintenance of native biota in their current conditions, but also enhance or improve habitats and thus benefit associated biota

7.4 OPPORTUNITY TO EXPAND NON-FLOW MANAGEMENT OPTIONS TO IMPROVE AQUATIC AND RIPARIAN HABITAT

Summary Comment: A commenter noted that Glen Canyon Dam is presently functioning to protect native aquatic and riparian species from upstream and downstream threats. However, the very existence of the Dam is at odds with the National Park Service (NPS) Organic Act and the enabling legislation of Grand Canyon National Park. This means that the management objectives

of the NPS at Grand Canyon do not really include using the Dam to foster aquatic and riparian habitat rehabilitation. Reclamation and the NPS could be doing much more to improve riparian habitat quality, particularly now that much of the non-native tamarisk habitat along the river is declining due to tamarisk leaf beetle introduction. Collaboration of these two agencies in this DEIS and the Record of Decision is an opportunity to greatly expand non-flow management options to improve aquatic and riparian habitat area and quality.

Response: The LTEMP is intended to identify operational and experimental management alternatives specifically for protecting and enhancing aquatic, riparian, and terrestrial habitats and their associated biota, as well as protecting cultural resources and balancing human uses in the system. Alternatives considered in the EIS include flow conditions that may support improvements in riparian and aquatic habitats. The LTEMP also includes non-flow management options, such as mechanical trout removal, that may benefit native aquatic biota in the system. All the action alternatives also include a non-flow vegetation treatment experiment to address riparian vegetation including removal of invasive species and replanting of natives. The agencies have been working together, and expect to continue that collaboration beyond the ROD for protecting and improving natural and cultural resources while providing for cultural, recreational, and commercial uses and activities in the Grand Canyon National Park.

7.5 HFEs SHOULD BE INCLUDED IN THE EVALUATION OF EFFECTS TO NATURAL PROCESSES

Summary Comment: A couple of commenters stated that since HFEs have a direct effect to fisheries, plants, animals, and water quality, they should be considered in the effects on natural processes.

Response: HFEs were considered in the effects on all resources in Chapter 3, as well as on Natural Processes.

8 PROCESS AND POLICY

8.1 INCLUDE THPOs IN CONTACT LIST

Summary Comment: Commenters on this issue requested that THPOs be included in the list of groups to be contacted.

Response: Text has been modified as suggested and THPOs have been added to the list of groups to be contacted.

8.2 TRIBES INVOLVEMENT IN ALTERNATIVES DEVELOPMENT

Summary Comment: A commenter on this issue indicated that Tribes should have been invited to participate in alternative development like the Arizona Game and Fish Department was.

Response: Tribes were invited to be Cooperating Agencies in the LTEMP EIS process – see Section 5.1.3 for the process that was used to inviting and communicating with Tribes. Many meetings were held with Tribes throughout the alternative development process, the modeling development and results, the structured decision analysis, and the draft writing and editing to allow for input and comment. Meetings are still continuing with Tribes on the programmatic agreement and on a non-native fish agreement related to the LTEMP. Several traditionally associated Tribes are part of the AMWG process as well as being cooperators, and so were part of the LTEMP process through many meetings and webinars provided through that process.

8.3 SIERRA CLUB'S SCOPING COMMENTS

Comment Summary: The commenter on this issue requested that Sierra Club's scoping comments be added to the official public record and requested that their comments be addressed in the Final Environmental Impact Statement.

Response: We apologize that the Sierra Club scoping letter was inadvertently left out of the initial scoping report that was made available on the LTEMP website. Thank you for calling this to our attention in your comments on the DEIS and we have now added your scoping letter to that report and made the revised version available on our website. Your letter was reviewed and considered in the process of drafting the LTEMP EIS. Below is a summary of the issues you presented in your scoping letter and how we have addressed them in this EIS process.

1) Introduction – concern regarding declining conditions since the dam has been in place – 95% sediment loss, nutrient base, dissolved oxygen, temperature reduction, changes to flood regime, extirpated species, increasing non-native plant species.

Response: This list of concerns were considered in the preparation of the EIS. Chapter 3 of the EIS describes changes that have occurred in the Colorado River Ecosystem since construction of the dam.

2a) Legal Authorities - hydropower generation should be removed from the need statement.

Response: The purpose and need statement clearly articulates the responsibilities of the Secretary of the Interior under the Grand Canyon Protection Act (GCPA); the goal of which is to preserve, mitigate adverse impact to and improve the values for which Grand Canyon National Park and Glen Canyon National Recreation Area were established, including, but not limited to natural and cultural resources and visitor use. The purpose and need and alternatives evaluated in the EIS take direction from the GCPA and attempt to develop an alternative that meets the requirements of the GCPA and applicable Federal laws, regulations, and policies. In addition to Section 1802(a) of GCPA, the Secretary is required to follow numerous other Federal laws, including the 1956 Colorado River Storage Project Act. Both Section 1 quoted in the letter, and Section 7, direct the Secretary to generate the greatest practicable amount of power at Glen Canyon Dam. This requirement is also found in Section 1802(b) of the GCPA. Therefore, removal of power generation from the purpose and need statement in the EIS would be inconsistent with other parts of the GCPA.

2b) Scientific Framework – Full analysis of downstream resources. GCMRC involvement. Clear experimental framework, thresholds, triggers. Implement recovery of native species, and analyze alternatives that experiment with sediment augmentation, temperature modification and restoration of the natural hydrograph.

Response: The LTEMP EIS provided a full analysis of downstream resources that could be affected by the proposed action and alternatives. GCMRC was involved in the development of alternatives, in developing modeling approaches, in subject matter expert meetings throughout the process, in reviewing and editing the EIS, and in peer review of models and finally in the development of a science plan to guide the implementation of LTEMP once a final preferred alternative and ROD are in place. The reintroduction of extirpated species was outside the scope of the LTEMP as stated in Section 1.5.3. Early in scoping, we did consider some alternative concepts with new infrastructure, but determined that consideration of new infrastructure on the dam such as sediment augmentation and temperature modification were outside of the scope as well as economically infeasible at this time as stated in Section 1.5.3. In early scoping we did evaluate several alternatives that would have resulted in dam releases intended to mimic the natural hydrograph. However, preliminary modeling indicated several of those had unacceptable adverse resource impacts, particularly to sediment. Seasonally Adjusted Steady Flows was the most natural hydrograph in an alternative and was carried all the way through as Alternative G. The preferred alternative does incorporate two types of spring releases (sediment triggered and proactive spring HFEs) which provide peak flows that mimic the natural hydrograph to some degree.

3) Modification of Purpose and Need

Response: Please see the answer to Legal Authorities comment.

4) Impacts to Natural Resources – Sediments and Soils

Response: Sediment conservation was fully considered and analyzed in the LTEMP EIS using the best available science and modeling. See Sections 3.3 and 4.3. All of the action alternatives

included high flows of various types and frequencies. The effect of the flow regimes on natural processes and native species was considered in the analysis based on the best available information.

5) Impacts on Natural Resources – Threatened, Endangered and Sensitive Species

Response: Endangered, threatened and sensitive species were considered in the LTEMP EIS analysis based on the best available science and modeling. See Sections 3.5, 3.7, 4.5, 4.7.

6) Unsuccessful Native Fish Recovery

Response: Temperature and flow effects of the preferred alternative on native fish were evaluated in the LTEMP EIS. The preferred alternative includes a spring high flow, called a proactive spring HFE, which would occur generally at a time that the historical record indicates was when spring flooding in Grand Canyon typically occurred. Though proactive spring HFEs have been designed for sediment conservation purposes, they may provide experimental data through GCMRC monitoring efforts on effects to native fish. Though all of the alternatives are expected to have relatively similar effects on native and endangered fish, the preferred alternative includes several actions to manage nonnative fish and experiments designed to improve aquatic invertebrate populations in order to benefit native fish. The preferred alternative performed slightly better than No Action on several native and endangered fish metrics.

7) Unsuccessful Adaptive Management Program: The unsuccessful "Modified Low Fluctuating Flow Alternative" (MLFF) enacted in the Adaptive Management Program has not achieved the desired results of protecting the Canyon's resources including the beaches, the native fishes, and the cultural sites. New alternatives should be developed by the Grand Canyon Monitoring and Research Center to address scientific hypotheses regarding the best possible alternative for sediment retention (i.e., Wright et al. 2008) and mimicking the natural historic hydrograph.

Response: GCMRC helped in the development of alternatives and a seasonally adjusted steady flow alternative was considered as Alternative G. Several alternatives, including the preferred alternative, performed better than No Action on beach and sandbar building metrics.

8) Cumulative Impacts

Response: Cumulative impacts to vegetation, fish, wildlife and endangered species were analyzed in the LTEMP EIS (see Section 4.17). The EIS incorporates elements of, and will supersede, the HFE Protocol and Non-Native Fish Removal Protocol that have been in place since 2012.

9) Impacts on Natural Resources – Water Quality: Restoration of water quality must be addressed in the EIS taking into account the effects of different release structures and their effects on downstream ecology. The EIS should also consider salinity levels, water temperature, turbidity and suspended sediment, nutrients and dissolved oxygen concentrations. An additional critical factor that must be considered is the impact of drought

on the quality of dam releases. For example, when Lake Powell is lower, water releases are warmer than, and oxygen levels differ from, water released from a fuller lake

Response: Impacts to water quality in the Colorado River and reservoirs were considered in the LTEMP EIS. See Sections 3.2 and 4.2. Climate change was analyzed with respect to hydrological effects in Section 4.2. It should be noted that the LTEMP did not affect levels of Lake Powell and Lake Mead at an annual or great time scale; the scope of the LTEMP includes monthly, daily and hourly releases from Glen Canyon Dam, but not annual volumes from Glen Canyon Dam, so the effects to water quality were considered within this scope.

10) Impacts of Reduced Flows Associated with Climate Change: The LTEMP must specifically create a plan for providing water to the Colorado River in Grand Canyon during extended drought periods.

Response: Climate change was considered within the LTEMP EIS. The 2012 Colorado River Basin Study provided data for the EIS, and the modeling included a set of modeling runs to address climate change concerns. This climate change modeling did not alter the pattern of performance of the alternatives and the preferred alternative still performed well when considered in the context of projections regarding future climate change. The scope of the LTEMP includes monthly and hourly releases from Glen Canyon Dam, but not annual volumes from Glen Canyon Dam, so the scope of the analysis was considered with respect to for monthly and hourly changes.

11) Impacts on Natural Resources – Terrestrial Wildlife

Response: Impacts to terrestrial wildlife were considered in the LTEMP EIS in Section 4.7.

12) Impacts on Natural Resources – Vegetation

Response: Impacts to vegetation were considered in the LTEMP EIS in Section 4.6. There was considerable discussion between joint lead staff and GCMRC about different flows to benefit native vegetation species. We discussed the timing and scouring effects of various water flows that could disadvantage nonnative species. Modeling was performed using the best available vegetation model and GIS mapping information and the preferred alternative performed better than the No Action alternative for maintaining native vegetation condition. However, under all alternatives, vegetation condition is expected to decline over time. Because of this, a feature common to all of the action alternatives analyzed in this EIS is an experimental vegetation treatment project to address nonnative vegetation removal, native vegetation planting and other vegetation issues. This was developed in coordination with GCMRC and after discussions with other partners and Tribes.

13) Commenter Recommendations

Recommendation: Restore essential sediment and nutrients into the main stem of the Colorado River in the Grand Canyon.

Response: Sediment conservation was a resource goal as expressed in Section 1.4. More even monthly volumes and frequent HFEs are components of the preferred alternative to address sediment conservation.

Recommendation: Restore flow regimes to properly transport the sediment and nutrients within Grand Canyon, when and where it belongs. The 1994 Biological Opinion and the EIS referred to these as Seasonally Adjusted Steady Flows (USDOI 1995)

Response: The LTEMP EIS evaluated a seasonally adjusted steady flow option, Alternative G, however it was not identified as the preferred alternative as Alternative D showed a better balance to protect downstream resources.

Recommendation: Restore the seasonally variable water temperature in the main stem of the Colorado River through Grand Canyon. The 1994 Biological Opinion and the EIS referred to this as Selective Withdrawal by means of a Temperature Control Device (USDOI 1995). Look to the Temperature Control Device at Flaming Gorge Dam as a source of information and experimentation to guide planning at Glen Canyon Dam. Answer the question of "whether the potential benefits to the endangered fish of operating a TCD and warming the water outweigh the potential adverse effects from potential increases in nonnative predators, parasites and diseases, or other unintended, systemic interactions in the downstream environment." (USDOI USBOR 2007) It is entirely possible – even probable -- that native fish will perform better in the temperature environment in which they adapted (i.e., Clarkson and Childs 2000).

Response: Flow options for affecting temperature were considered as part of the LTEMP and the preferred alternative includes an experimental option for low summer flows. Temperature control devices were outside the scope of this project.

Recommendation: Implement a restoration and recovery program for the Colorado River corridor in Grand Canyon that includes the recovery of all species known to be native to Grand Canyon prior to the operation of Glen Canyon Dam.

Response: The reintroduction of extirpated species was outside the scope of this EIS and is discussed in Section 1.5.3. LTEMP EIS alternatives include experiments that are intended to improve conditions for ESA-listed species and other special status species. The LTEMP EIS team used the best available science and peer-reviewed modeling to determine the potential effects of these alternatives on these species. DOI has worked closely with FWS throughout the 5-year EIS process to ensure that the appropriate experiments, dam operations, and non-flow actions were identified as conservation measures. Formal consultation with FWS has resulted in a Biological Assessment and Biological Opinion on the effects of the proposed action on listed species and designated critical habitat, as presented in Appendix O of the EIS.

The original notice of intent to prepare the LTEMP EIS identified the need to determine whether to establish a recovery implementation program for endangered fish species below Glen Canyon Dam. The LTEMP team found that identifying the need to determine whether to establish a recovery implementation program (RIP) for endangered fish species below Glen Canyon Dam did not meet the purpose and need for the action.

Recommendation: Implement a non-native eradication program to minimize alien species in the Grand Canyon river corridor with a priority on those that prey on, compete with, or otherwise impair the health of native plants and animals. Non-native fish retention should not be a priority in designing new flow regimes.

Response: The LTEMP EIS included and evaluated a number of tools for address non-native fish and non-native vegetation. Some Tribes, particularly Zuni and Hopi, have concerns regarding non-native fish removal methods, so the preferred alternative contains some constraints and mitigation measures to address those concerns.

Recommendation: Complete the Little Colorado River Management Plan as recommended by the 1994 Biological Opinion (USDOI 1995).

Response: Development of this plan is considered outside the scope of the LTEMP EIS.

Recommendation: Address the dysfunction of the Adaptive Management Program. The AMP should be replaced by an open source and independent body of research and advisory scientists, where the monitoring and research data are consistently and thoroughly peer-reviewed prior to providing any recommendation to the Secretary of Interior. The Grand Canyon Research and Monitoring Center should have a significant role in creating the LTEMP, including choosing testable hypotheses, designing best-case flow scenarios to retain sediments and native species in Glen and Grand Canyons, and crafting monitoring regimes.

Response: We assume the commenter is referring to the Adaptive Management Work Group (AMWG) when they refer to the AMP. The GCMRC was involved throughout the LTEMP process and assisted as subject matter experts in with the modeling, analysis, experimental design and assisted with peer review of aspects of the LTEMP. The AMWG is a FACA committee established through the GCPA and exists to provide input to the Secretary of the Interior. Changes to the organization of the committee should be directed to the Secretary. Changes to the structure and focus of the AMWG are outside the scope of this EIS.

Recommendation: Assess how the river could be managed with shrinking reservoirs and emphasize water conservation in long-term dam and reservoir management plans. A study by the National Research Council has indicated that long-term drought is the likely outcome of climate change in the Southwest (NRC 2007). The Bureau should consider at what point river management – specifically, water and power needs – would be better served by maximizing water storage in Lake Mead rather than dividing it between Mead and Powell reservoirs. In fact, an article released just this week raises tensions about keeping Lake Mead full see http://www.climatecentral.org/blogs/dry-weather-is-drawing-down-lake-mead/, accessed 1/31/12). The Bureau should assess the comparative loss of water from bank storage and evaporation between these two maintaining both reservoirs, maintaining only Lake Mead, and an alternative where Lake Powell is kept low to reduce "losses" to infiltration and evaporation.

Response: The LTEMP EIS evaluated a range of annual hydrologic inflow scenarios. It also evaluated a range of monthly, daily, and hourly releases from the Glen Canyon Dam while complying with the LROC as currently implemented through the 2007 Interim Guidelines. The "Fill Lake Mead First" alternative was dismissed as it was outside the scope of the LTEMP. We

also addressed the impacts of climate change in the EIS, which could result in "shrinking reservoirs" in the future.

Recommendation: An alternative that examines what would be required to generate a flow magnitude equal to the pre-dam annual or bi-annual average peak flow, and/or a flow that exceeds the current annual average flow by the same proportion as a pre-dam peak exceeded pre-dam average annual flow, should be included, so that such a flow could be planned when water is available.

Response: Flows greater than 45,000 cfs were considered but dismissed as part of this process for a number of reasons including operational and safety concerns.

Recommendation: If beach sizes continue to shrink, recreational capacity should be adjusted downward to prevent exacerbating beach erosion, damaging cultural sites, and damaging vegetation.

Response: The preferred alternative is expected to increase beach and sandbar size. Visitation is a separate process and not an issue within the scope of the LTEMP EIS. Visitation is set currently through the 2006 Grand Canyon Colorado River Management Plan.

Recommendation: Specific trigger points to guide management decisions must be outlined in the plan. If the dam is truly to be adaptively managed, then the LTEMP must identify detectable thresholds that, if reached, will cause a change in operations to be executed.

Response: The adaptive management process and triggers are adequately addressed in this NEPA document. Section 4.1 and Appendices C and K of the LTEMP DEIS have detailed information on the extensive modeling that was performed with a variety of long term strategies and referring to uncertainties explicitly. The long term strategies were variations of the alternatives that turned various experiments "off" or "on" to model different combinations and frequencies of experiments under a variety of hydrologic inflow conditions. This extensive modeling was coupled with extensive literature review and subject matter expert input to provide thorough analysis. This is sufficient for a NEPA analysis. Additional details of experiments and monitoring will be developed through the AMP annual work plans. Greater specificity regarding triggers for HFE implementation and humpback chub actions have been added to the EIS (Appendices O and P).

Recommendation: A healthy Colorado River in Glen and Grand Canyons must be the top priority of all alternatives proposed in the LTEMP, in order to meet the requirements of the GCPA. There is no evidence that Glen Canyon Dam can be operated to restore species and beaches to their pre-dam condition. This plan should be devised as a last, best effort to restore the National Park Service lands downstream of Glen Canyon Dam. Planners should think holistically about what is required to achieve restoration goals, and create alternatives that aim for success. The cost of these alternatives may be high, but will represent the full cost of Glen Canyon Dam to the American public. We are subsidizing the services provided by Glen Canyon Dam by giving away parts of the Colorado River ecosystem for free, and we deserve to know what it will cost to replace all of it.

Response: The GCPA is central to the purpose and need for this project.

Recommendation: Consider the non-use economic value of the Colorado River to the power and water market area when conducting economic analyses.

Response: A non-use economic study was completed as part of the LTEMP EIS process, however it was completed after the release of DEIS. The results were very comparable to the previous Welsh 1995 study. The results of the new study have been incorporated in the FEIS in Section 4.14.

Recommendation: This is an Experimental and Management Plan. Experimentation must be a component of all alternatives. That is, clearly defined hypotheses, ample monitoring and data analyses, and timely reporting need to be included in every alternative.

Response: Experimentation is included in the LTEMP EIS. Triggers for sediment experiments are clearly articulated. For several fish experiments triggers were developed and defined through the consultation process with FWS with information provided from GCMRC and other experts and cooperators. GCMRC also developed a science plan and will be intimately involved in the implementation of LTEMP experiments through the triennial budget process and on-going monitoring, evaluation and reporting.

Recommendation: The Grand Canyon Monitoring and Research Center should be involved in the development of dam operations alternatives and analyzing the pros and cons of different flow regimes. They should provide significant input into developing testable hypotheses, monitoring regimes, and determining thresholds that will trigger operational changes.

Response: GCMRC was involved throughout the LTEMP EIS process.

Recommendation: Glen Canyon Dam is now approximately 50 years old, and its right spillways have never been tested. We have now experienced climate fluctuations that have come very close to testing both the highest capacity and the lowest capacity of the dam for controlling water flow into the Lower Colorado River. There needs to be a plan for dam failure, either by overtopping or by extremely low lake levels. The safety of the dam, spillways, and adjacent sandstone walls should be examined in this analysis.

Response: Dam safety is a priority of the Bureau of Reclamation and is evaluated comprehensively through Reclamation's Dam Safety program on an -ongoing basis. These on-going evaluations are wholly independent of LTEMP and beyond the scope of this NEPA analysis.

8.4 INVOLVEMENT OF COOPERATING AGENCIES AND SME TEAMS

Summary Comment: Commenters on this issue expressed concern regarding a lack of involvement by Cooperating Agencies on SME teams or in the analysis process, or requested more involvement in ongoing and future research and management of CRE resources.

Response: For the LTEMP EIS process there was a high level of involvement and interaction between the joint lead agencies, the Tribes, the cooperators and the stakeholders of the Adaptive Management Working Group (AMWG). There were also several opportunities for public input above and beyond what is required by NEPA. For over four years regular monthly calls were held with Tribes and cooperators, totaling over 50 meetings. Western Area Power Administration (WAPA) was involved in many additional meetings for alternative development and hydropower subject matter expert questions. Well over 150 meetings were held between the joint lead agencies, Tribes and stakeholders during the course of the development of the draft EIS. All cooperators, Tribes and AMWG stakeholders were provided the opportunity to comment on the purpose and need, objectives, resource goals, modeling metrics, modeling methods, and preliminary modeling results. All cooperators and Tribes were afforded review and comment on a preliminary draft of the EIS as well as the public draft EIS. The joint leads also held additional meetings with Tribes, held many consultation meetings with Tribal councils and provided Tribes the opportunity to submit text to fully reflect their perspectives on all resources within the EIS. Implementation details of experiments and monitoring tailored to the specific resource conditions of the year will be developed through the AMP and GCMRC annual work plans with communication and consultation with a number of partners and stakeholders.

8.5 LTEMP EFFECTS ON RESERVOIR OPERATIONS

Summary Comment: A commenter on this issue requested assurance that management actions and experiments proposed in the DEIS will not operate to modify determinations made under the Interim Shortage Guidelines for both Lake Powell and Lake Mead or to trigger a mid-year review of reservoir operations that would otherwise not occur.

Response: The scope of the LTEMP EIS was to evaluate a range of alternatives with different monthly, daily, and hourly releases from the Glen Canyon Dam. All alternatives are consistent with the LROC as currently implemented through the 2007 Interim Guidelines for annual release volumes. See Sections 3.2 and 4.2 for additional detail.

8.6 LIST RELEVANT LAWS AND MANAGEMENT DOCUMENTS

Summary Comment: A commenter on this issue stated that it is unclear as to how the extensive list of laws identified in the DEIS is specifically relevant to the proposed actions. The FEIS would benefit from identifying only those laws and management documents that are directly related and pertinent to the LTEMP process, or explaining why additional laws are included.

Response: Minor changes have been made. The text was revised to focus on the most relevant laws. There is a statement that these lists are not exhaustive.

8.7 APPLICATION OF STRUCTURED DECISION ANALYSIS (SDA)

Summary Comment: Some commenters questioned and did not support the use of SDA to help determine operations at Glen Canyon Dam, did not participate in the voluntary SDA process for

LTEMP, and rejected any reliance on SDA as the basis for operating Glen Canyon Dam to implement the LTEMP for the next 20 years. Some commenters stated that the DEIS relies on a flawed SDA and SDA should not be included in the DEIS as a basis for selecting a Preferred Alternative.

A commenter believed that the SDA overly relied on modelling outputs to claim objectivity and transparency when actual results depended heavily on the assumptions made in creating the models, inputs selected for running the models, and the manner in which the modeling analyses were made and results reported. The commenter believed that the DEIS relied on modeling outputs to justify a scientific and objective result without acknowledging the significant subjectivity that goes into creating and running the models in the first place.

A commenter believed that the DEIS is legally deficient because it relies on an inadequate and incomplete analysis of hydropower developed for the SDA process.

A commenter stated that the DEIS is Legally Inadequate because it Relies on Flawed Structured Decision Analysis. Specific to the hydropower Performance Metric, because of the varying degrees to which swings and weights are established for the various performance metrics, the hydropower metric is automatically given less weight than other metrics. The swing weighting is set up in such a way that sediment is weighted far more importantly than hydropower.

Response: In an effort to provide multiple opportunities for interested stakeholders to provide input in the LTEMP process, the National Park Service (NPS) and the Bureau of Reclamation (BOR) decided to incorporate facilitated structured decision analysis (SDA) into the LTEMP EIS process. The use of SDA in the LTEMP process was not required by NEPA, nor did it replace the NEPA impact analysis. Participation in the SDA process was a voluntary opportunity for stakeholder input. Text was modified to note that not all stakeholders were in support of the process. See Sections 1.7, 2.1 and Appendix C which explain that SDA one of the many tools utilized in this EIS. Text was revised to clarify the scope and authority of resource goals. As stated in Section 1.7, "While structured decision analysis informed the analysis of the joint leads, it was not the only method by which a preferred alternative was identified. The identification of a preferred alternative was based on the full DEIS analysis and considerations relating to qualitative and quantitative evaluations of impacts. Public comment, socioeconomic considerations, AMWG stakeholder input, and other factors were all considered in this decision." All models have limitations and this EIS includes disclosure of those limitations, as well assumptions. The models and the SDA analysis have also been peer-reviewed.

Section 4.1 and Appendices C and K of the LTEMP DEIS have detailed information on the extensive modeling that was performed with a variety of long term strategies. The long term strategies were variations of the alternatives that turned various experiments off or on to model different combinations and frequencies of experiments under a variety of hydrologic inflow conditions. This extensive modeling was coupled with extensive literature review and subject matter expert input to provide thorough analysis. This is sufficient for a NEPA analysis. EPA gave this document an LO-1 rating, the highest possible.

The swing weighting results were not used to quantitatively evaluate the impacts to hydropower in Chapter 4. Any analysis of swing weighting was independently used in Appendix C and was not the only criteria used for identifying a preferred alternative.

8.8 DOI DISCLAIMER

Summary Comment: A commenter recommended that the FEIS and ROD include appropriate disclaimer language to allow the various interested stakeholders to refrain from disputing or contesting general legal characterizations in the DEIS.

Response: DOI will consider the proposed disclaimer language for inclusion for the ROD.

8.9 DOI RESPONSE TO COMMENTS

Summary Comment: A number of commenters requested acknowledgement and response to their comments, that their comments be incorporated into the EIS, that revisions be shown as tracked changes. Commenters stated that they reserve the right to supplement their comments, and requested that their comment letter, material cited, and DOI response be incorporated into the LTEMP administrative record.

Response: Comments were solicited, collected, and incorporated into the FEIS in accordance with CEQ NEPA regulations and DOI policy and guidance.

8.10 COMMENT PERIOD DEADLINE

Summary Comment: A number of commenters stated that DOI had made several statements as to when comments needed to be mailed and received, causing confusion.

Response: All comments uploaded to the NPS PEPC site or received at Argonne with a postmark of May 9, 2016 were considered. The Federal Register notice states: “Reclamation and the NPS will accept‘ comments that are received or postmarked by May 9, 2016.”

8.11 LANGUAGE REGARDING LROC

Summary Comment: A commenter stated that the LTEMP EIS should not include subjective language regarding implementation of LROC or Interim Guidelines.

Response: Nothing in this document affects future decisions regarding the LROC. We have reviewed the text and modified as appropriate to make that clear.

8.12 DESCRIPTION OF HFE PROTOCOL AND NONNATIVE FISH CONTROL PROTOCOL FOR THE PREFERRED ALTERNATIVE

Summary Comment: Commenters suggested that the specific protocols for implementation of HFEs and nonnative fish control under the preferred alternative should be specified in the EIS rather than simply referring to the existing protocols.

Response: Protocols to be followed for implementation of HFEs and nonnative fish control are presented in the EIS in Section 2.2.4.6, Appendix O (Biological Assessment), and Appendix P (HFE protocol for the preferred alternative). Appendix O includes an attachment that describes the triggers to be applied to various experimental aquatic resource actions and the basis of those triggers.

8.13 CONSERVATION MEASURES TO BE APPLIED UNDER ALTERNATIVE D

Summary Comment: One commenter suggested that the conservation measures to be applied under Alternative D should be identified and described.

Response: Conservation measures to be applied under Alternative D are described in Section 2.2.4.6 and Appendix O (Biological Assessment) of the EIS.

9 RECREATION

9.1 NOTE ECONOMIC BENEFITS OF THE RECREATION INDUSTRY

Summary Comment: Commenters stressed the importance of accounting for the benefits of river recreation to the local economy and enumerated the various direct and indirect economic activities associated with recreation, including rafting trip fares paid by visitors, franchise fees paid by rafting companies, support of rafting services, outfitters and businesses in the area, and spending on car rentals, hotel stays and restaurants. One commenter suggested that trout fishing may not be as important as it is perceived to be.

Response: These issues were all considered in the recreation economics sections of the LTEMP EIS; see Section 4.14 and Appendix L of the EIS. The EIS analysis fully considered the direct and indirect economic effects of recreation use in the project area.

9.2 RECREATION RESOURCE GOALS INCOMPLETE

Summary Comment: Commenters expressed that recreation in the Grand Canyon has been understudied in general as compared to other resources and thus that recreation resource goals and impacts on recreation are not sufficiently articulated in the LTEMP EIS.

Response: Recreation is one of the aspects of the Grand Canyon Protection Act which is an inherent part of the purpose and need for the LTEMP EIS and Section 1.4 includes goals and objectives for recreation. Although there are a limited number of recreation studies, the LTEMP team utilized best available studies for this EIS and utilized modeling where appropriate to address many aspects of recreation. See Section 4.10.

9.3 ADOPT THE GOALS AND OBJECTIVES OF THE AZGFD FISHERIES MANAGEMENT PLAN

Summary Comment: Commenters requested that the goals and objectives of the Arizona Game and Fish Department be incorporated into the LTEMP EIS and that the Arizona Game and Fish Department Fisheries Management Plan- Colorado River-Lees Ferry (Rogers 2015) be cited along with the Park Service's Comprehensive Fisheries Management Plan in the discussion of the recreational fishery.

Response: The AZGFD management plan and NPS's Comprehensive Fisheries Management Plan are independent of the LTEMP EIS. Because of differences in aspects of the two plans, at this time, the joint leads cannot include the objectives of the AZGFD plan or reference this plan in its current form. See also response to comment summary 3.9.

9.4 ADOPTION OF MLFF FLOWS CORRESPONDED WITH DEGRADATION OF THE LEES FERRY FISHERY DROP IN VISITATIONS

Summary Comment: A commenter observed that angler satisfaction and use was very high in the 1970s and 1980s, but declined following the advent of MLFF and the implementation of HFEs.

Response: DOI has not identified any studies that attribute the reduction in angler use days or satisfaction to the advent of MLFF or the implementation of HFEs. No change to the EIS was made in response to this comment.

10 TRIBAL RESOURCES[1]

10.1 OPPOSITION TO MECHANICAL REMOVAL OF TROUT AND TROUT MANAGEMENT FLOWS

Summary Comment: Comments in this category generally oppose mechanical removal or trout management flows due to the adverse effects these actions would have on the cultural values ascribed to the Canyons and Rivers by the Hopi, Zuni and other Tribes. Of particular note are the adverse psychological and sociological effects to the larger Zuni community during mechanical removal and trout management flow actions, the taking of life without justification, and the seemingly opposing management objectives for trout. Additional comments support the Tribal perspective on these matters.

Response: DOI considers mechanical removal as an important tool for minimizing risk to downstream endangered fish from trout regardless of the cause of trout population increases or migration. DOI acknowledges the potential negative effects from all alternatives (and common to all actions) that include the taking of life in the Canyon through direct removal and/or trout management flows. We recognize the Hopi and Zuni perspective on mechanical removal and trout management flows and are committed to working with Tribal leadership on ways to address the ongoing concerns and ensure appropriate mitigation within the river corridor. Under the LTEMP EIS preferred alternative TMFs would only be used when triggered by situations where high numbers of young of the year are predicted. In years when TMFs or mechanical removal may be appropriate, the joint-leads would discuss the trout conditions of the year with AZGFD, GCMRC, and concerned Tribes prior to implementing to develop appropriate options to lessen the potential negative impacts from the proposed actions. In response to specific Zuni comments regarding Zuni perspectives on the adverse effects to their community, we have retained language in 4.9.3 and added language to a number of sections, most specifically in Section 4.9.1.3.

10.2 LACK OF TRIBAL REPRESENTATION IN DEVELOPMENT OF EIS

Summary Comment: Comments in the category generally question the representation of Tribes in the development of the EIS including whether or not Tribal members were part of the SME teams, how many Tribes were contacted in regards to the LTEMP EIS, and how many and what types of Tribal consultation meetings were held.

Response: NPS and Reclamation are committed to working with Tribal communities in order to better understand their concerns in regard to the LTEMP process. Initially, 43 Tribes, bands, and organizations were formally invited to enter into government-to-government consultation on the LTEMP EIS. Five chose to participate as Cooperating Agencies. Cooperating Agencies were invited to monthly conference calls to review progress and reach agreement on major issues

[1] Comments and responses related to Tribal concerns are also presented in Section 11, Socioeconomics and Environmental Justice.

during the preparation of the LTEMP DEIS. In addition, a number of face-to-face meetings as well as webinars and conference calls were held. Detailed information on the consultation process can be found in Chapter 5 and Appendix N. Under most resource sections there are also Tribal perspectives section where the concerns of Tribes are explained in their own words.

10.3 METRIC SHOULD NOT BE USED TO ANALYZE IMPACTS TO CULTURAL AND TRIBAL RESOURCES

Summary Comment: Comments under this category suggest that metrics used to analyze the impacts to cultural and Tribal resources were unwarranted. Specifically, comments suggested that there is little data to support the wind-blown sediment hypothesis and Sand Load Index in relation to availability of sediment for wind deposition and that Time Off-River is not a viable metric to evaluate visitor impacts to archaeological sites.

Response: We have used the GCDAMP Desired Future Conditions (DFCs) as a basis and as a guide for the resource goals and performance criteria. The Cooperating Agencies, Tribes and AMWG stakeholders were given several opportunities to comment on these for the LTEMP EIS and a number of changes were made based on those comments. We also sent the AMWG members and Cooperating Agencies a draft document of the resource goals and objectives on March 27, 2013 that further illustrated how the DFCs were used in developing each resource goal and objective.

The metric values for the Sand Load Index represent the potential for sand to be transported to cultural sites rather than the actual transport that would occur or the level of protection that transport may provide to cultural sites. The EIS acknowledges that the extent to which wind-deposited sediment can stabilize and protect archaeological sites is limited by the local geomorphology and vegetation. The text in Section 4.8.2 and Appendix H has been updated to reflect the most recently published studies regarding wind-blown sediment.

Tribes regularly monitor the condition of culturally important sites and resources within the Canyons. Many Tribes have noted intentional and unintentional damage to sites from visitors, including trailing, trampling, removal of vegetation, disturbance of artifacts, vandalism, and disruption of the sacred context through inappropriate behavior (See Sections 3.9 and 4.9). The time-of-river metric was included to respond this concern. The results showed that there was very little difference among the alternatives for time-off-river.

10.4 CULTURAL LANDSCAPES AND TRADITIONAL CULTURAL PROPERTIES NOT THOROUGHLY DISCUSSED

Summary Comment: Comments in this category suggest that Traditional Cultural Properties, have not been thoroughly analyzed and that the larger cultural landscape of the LTEMP study area, including the Grand Canyon as a Historic National Landmark was not acknowledged.

Response: The LTEMP EIS references forthcoming National Register of Historic Places nominations for the Hopi, Zuni, Navajo, and Hualapai TCPs in Section 3.9. The designation of

the Grand Canyon as a Historic National Landmark is outside the scope of this EIS; however, DOI will continue dialog with the Hualapai and other Tribes throughout the PA process and within the AMWG regarding the importance of cultural resources.

10.5 TRIBAL LANDS AND RESOURCES ON TRIBAL LANDS NOT TAKEN INTO CONSIDERATION

Summary Comment: The comment under this category suggests that the LTEMP EIS did not identify cultural resources on Hualapai and Navajo lands in the Introduction.

Response: The description of lands in this section uses terms based on geography of the canyons rather than on land ownership. Therefore, we feel the wording is appropriate as is; however, we did add text to reflect the perspective of various Tribal cultures regarding the interconnected nature of the cultural landscape.

10.6 IMPACTS TO HUALAPAI TOURISM OPERATIONS NOT THOROUGHLY ANALYZED

Summary Comment: Comments in this category were specifically from the Hualapai Tribe and indicated a concern with the lack of identification of potential impacts to Hualapai Tourism operations near Quartermaster Canyon as well as other Hualapai tourism operations.

Response: Potential impacts to Hualapai tourisms operations near Quartermaster Canyon and other Hualapai operations were consider in Sections 4.10. Based on the analysis conducted for the EIS, sedimentation near the Quartermaster Canyon would not vary significantly among the alternatives. The sedimentation this far down is primarily driven by other factors including the reservoir level at Lake Mead and annual release volumes which are outside the scope of the LTEMP EIS. Additional text was added regarding the details of Hualapai tourism operations in Sections 3.10 and 4.10 of the EIS. Text has been added under each alternative to clarify the impacts to Hualapai tourism operations.

10.7 TRIBAL PERSPECTIVES ON COMPONENTS OF THE COLORADO RIVER ECOSYSTEM

Summary Comment: Several commenters provided comments or text to add to Chapters 3 and 4 that expresses Tribal perspectives on components of the Colorado River Ecosystem such as fish, vegetation, and wildlife. The Zuni expressed concern related to the effects of management actions downstream of Glen Canyon Dam, specifically those directed towards fish, on the well-being of Tribal members.

Response**:** In most cases, the information provided by Tribes was incorporated as provided with only minor editorial modification as needed. Changes were made in Chapters 1, 2, 3, and 4.

10.8 EDITORIAL COMMENTS

Numerous substantive editorial comments were submitted by the Tribes on sections in the DEIS, including portions of Chapters 1, 2, 3, and 4, related to Tribal resources and concerns. Many of these comments were related to descriptions of resources or lands important to the Tribes, Tribal perspectives and views of specific resources in the Canyons or the Canyons as a whole and proper representation of Tribal views on aspects of the alternatives, especially actions that could affect aquatic ecology, vegetation, or wildlife within the Colorado River Ecosystem. In most cases, substantive editorial suggestions provided by Tribes were incorporated as provided with only minor editorial modification as needed.

11 SEDIMENT

11.1 CONCERN OVER EROSION OF SANDBARS AND BEACHES FOLLOWING HIGH FLOWS (I.E., HFEs)

Summary Comment: Commenters expressed concern that, while HFEs may provide benefits to certain beaches, they also create a net loss of sand and erosion to others.

Response: In Sections 3.3 and 4.3 there is discussion of the complexity of beach and sandbar response to HFEs. The geomorphology and other factors dictate that different HFEs build some beaches, but erode others and this is clearly stated but the average results are also considered and the modeling focuses on the average results. Based on the modeling and the extensive literature on sediment in the Grand Canyon, the preferred alternative is expected to perform well for sandbar and beach building and for many other downstream resources to comply with the GCPA. If there were unacceptable adverse impacts caused by HFEs, there is a process defined in the EIS through which HFEs would be suspended

11.2 SPRING HFES—UNCERTAINTY AND CONCERN OVER IMPACTS; MORE TESTING IS NEEDED

Summary Comment: Commenters emphasized that the uncertainties related to spring HFEs, resource trade-offs, and timing. They also noted that spring HFEs need to be experimentally tested and evaluated before adoption becomes an accepted management practice, but the current language surrounding the conduct of spring HFEs (as described in the Glen Canyon Dam High Flow Experiment Protocol Environmental Assessment) severely limits the potential for experimental testing of HFEs during the springtime period.

Response: DOI acknowledge that there are uncertainties regarding the potential impacts of spring HFEs and has reviewed the parameters under which springtime HFE's are conducted and the way in which the accounting periods are applied. Under the preferred alternative, there would be 4-7 spring HFEs on average over the 20 year period, which allows for testing and monitoring of impacts. Under the preferred alternative, spring HFE's are triggered based upon sediment triggers. GCMRC was consulted on the potential to modify the accounting periods and the scientists most familiar with the protocol did not believe it warranted a change in accounting periods.

11.3 EQUALIZATION FLOWS—CONCERN OVER INCREASED EROSION AND HIGHER RATE OF SEDIMENT TRANSPORT

Summary Comment: Commenters noted that equalization flows transport an enormous amount of sediment out of the system. As a result, they should be studied carefully and an effort should be made to change management practices to a proactive approach in order to minimize and mitigate the negative effects of equalization flows.

Response: The scope of this EIS does not include modification of annual volumes. Therefore alternatives that change equalization flows and other annual volumes were not included in this EIS. However, the EIS includes the full range of potential future releases, including equalization flows, to ensure a robust analysis of impacts to the alternatives. The alternatives analyzed in the LTEMP EIS looked at all practical approaches to conserving sediment via changes to monthly, daily, and hourly releases from the Glen Canyon Dam. Recognizing the science of sediment transport and flow, the range of alternatives include experimental proactive spring HFEs to mobilize and deposit or "park" sediment higher on the beaches in anticipation of annual releases greater than 10 maf. Further experimentation or approaches that may be devised in the future could be brought forward through the adaptive management program or GCDAMP triennial budget process and may or may not require additional NEPA compliance.

11.4 SEDIMENT SHOULD BE CONSIDERED A "SECONDARY" RESOURCE

Summary Comment: Commenters expressed concern that the characterization of sediment as the primary objective of the LTEMP EIS appears to be inconsistent with the AMWG-approved and Secretary-recognized identification of sediment as a "secondary" resource to be used to support other DFC resources (i.e., subset of the larger Colorado Ecosystem DFC).

Response: We have used the GCDAMP Desired Future Conditions (DFCs) as a basis and as a guide for the resource goals and performance criteria. The Cooperating Agencies, Tribes and AMWG stakeholders were given several opportunities to comment on these for the LTEMP EIS and we made a number of changes based on those comments. We also sent the AMWG members and Cooperating Agencies a draft document of the resource goals and objectives on March 27, 2013 that further illustrated how the DFCs were used in developing each resource goal and objective. The resource goals and objectives are based on the DFCs and consistent with them but relate more directly to the purpose and need of the LTEMP EIS. Recognizing the science of sediment transport and flow, several alternatives included proactive spring HFEs to mobilize and deposit sediment in anticipation of annual releases greater than 10 maf. Sediment conservation was a resource goal as expressed in Section 1.4.

11.5 CONCERN OVER SEDIMENT ACCUMULATION IN LAKE POWELL AND BEHIND THE DAM

Summary Comment: Commenters expressed concern related to the long-term accumulation of sediment into Lake Powell and its displacement of water storage, effect on flood control capacities, and potential impairment of downstream water delivery. Some commenters also requested a new and comprehensive sediment survey of Lake Powell, including a sediment removal plan.

Response: Long-term of accumulation of sediment into Lake Powell is an uncontrollable function of hydrology above Lake Powell and is also outside the scope of this EIS. The alternatives being considered do not affect the inflow of sediment into Lake Powell.

12 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

12.1 REGIONAL ECONOMIC IMPACTS ASSOCIATED WITH BOATING VISITOR EXPENDITURES

Summary Comment: Economic impacts associated with boating visitor expenditures on lodging, food and supplies, equipment sales and rentals, fuel, guide and license fees, etc. form an important part of the local and regional economy.

Response: The economic impacts associated with boating visitor expenditures are assessed in Section 4.14.2.3 of the EIS. The issues listed were considered in this analysis.

12.2 REGIONAL ECONOMIC IMPACTS ASSOCIATED WITH ANGLER VISITOR EXPENDITURES, IN PARTICULAR IMPACTS OF HFEs

Summary Comment: Economic impacts associated with angler visitor expenditures on lodging, food and supplies, equipment sales and rentals, fuel and guide and license fees, etc. form an important part of the local and regional economy.

Response: The economic impacts associated with visitor expenditures related to fishing are assessed in Section 4.14.2.3 of the EIS. The effects of HFEs were considered as well as the issues listed.

12.3 USE VALUES ASSOCIATED WITH ANGLING AND BOATING TRIPS

Summary Comment: Economic impacts associated with angler visitor expenditures on lodging, food and supplies, equipment sales and rentals, fuel and guide and license fees, etc., during HFEs would form an important part of the local and regional economy.

Response: Under current NPS regulations the number of angling boat trips would not change under any of the alternatives given the excess demand for boating permits, with no consequent impact on license revenues, or on employment and income in the region. In addition, access restrictions during HFE events under any given alternative may mean a slight decline in angler visits, slightly reducing license revenues, and employment and income in the region. These impacts are discussed in Section 4.14.2.3 of the EIS.

12.4 NON-USE VALUES ASSOCIATED WITH FISHING RESOURCES

Summary Comment: In addition to the economic impacts, use values associated with angling and boating trips, and non-use values associated with fishing resources are a significant part of the economic value of river resources.

Response: Use values associated with angling in the Upper Grand Canyon, and non-use values associated with fishing resources are assessed in Section 4.14.2.2 of the EIS.

12.5 ECONOMIC IMPACTS ON TRIBES

Summary Comment: Economic impacts of each alternative in individual Tribes should be considered in the EIS

Response: The economic impacts to Tribes were considered in the EIS in the recreation (4.10), Tribal Resources (4.9) and socioeconomics (4.14) sections. There were limitations based on the available data regarding hydropower impacts that precluded separating out impacts further by individual Tribe. The geographic location of minority and low-income populations in an 11-county region is described in Section 3.14.1.5 of the EIS. The environmental justice analysis described in Section 4.14.2.5 includes economic impacts on Tribal groups in the 11-county region as a whole. The impact of HFEs on Tribes is addressed in Section 4.14.2.4 of the EIS.

12.6 IMPACT ON WATER PROVISION

Summary Comment: Impacts of each alternative on water provision should be considered in the EIS.

Response: The scope of the LTEMP EIS was to evaluate a range of alternatives with different monthly, daily, and hourly releases from the Glen Canyon Dam. All alternatives are consistent with the LROC as currently implemented through the 2007 Interim Guidelines for annual release volumes. See Sections 3.2 and 4.2 for additional detail. Because the LTEMP EIS does not affect annual volumes, it will not affect water delivery, allocation or provision. Under the LTEMP variations of the reservoir elevations within the year are small and temporary and based on modeling would not affect potential water diversions from Lake Powell or Lake Mead.

12.7 REGIONAL ELECTRIC POWER ECONOMIC IMPACTS

Summary Comment: Regional economic impact of changes in retail rates and electric power capacity expansion on minority and low-income populations should be considered.

Response: The geographic location of minority and low-income populations in an 11-county region is described in Section 3.14.1.5 of the EIS. The environmental justice analysis described in Section 4.14.2.5 includes economic impacts on Tribal groups in the 11-county region as a whole. The impact of HFEs on Tribes is addressed in Section 4.14.2.4 of the EIS.

12.8 ECONOMIC IMPACTS OF ACTIVITIES OF CONFLUENCE PARTNERS OUT OF SCOPE OF EIS

Summary Comment: Economic impacts of the activities of Confluence Partners (the construction of a tram, walkway, restaurant and amphitheater) should be considered in the EIS.

Response: A full and comprehensive analysis of the impacts potential economic development activities by Confluence Partners was outside the scope of the EIS, however effects of the Grand

Canyon Escalade project based on available project information were considered within the cumulative impacts section (4.17).

12.9 DEPTH OF LITERATURE REVIEW ON USE VALUATION IN APPENDIX I

Comment Summary: The literature review on use valuation in provided in Appendix I does not provide a comprehensive overview of all the relevant literature on use values.

Response: The Appendix referred to (Socioeconomic Technical Information and Analysis) is now Appendix L. This appendix does not summarize use value literature, it provides a summary of the benefit transfer methods and models used to estimate recreation use values in the EIS. References were added in Chapter 3 (Section 3.14) and in appendix L to the Loomis 2014 study, which was a literature review to evaluate the potential for a passive use value for hydropower. More information on the background literature, data, and assumptions in applying the benefits transfer method to the analysis undertaken for the EIS can be found in Reclamation (2014).

12.10 MECHANICAL REMOVAL AND TROUT MANAGEMENT FLOWS

Summary Comment: The killing of fish through mechanical removal and trout management flows are objectionable to the Zuni sensibilities.

Response: Section 4.14.2.5 of the EIS recognizes that the Zuni have established a lasting familial relationship with aquatic life in the Colorado River, and that the taking of life through the mechanical removal of trout or TMFs is considered to be and adverse impact and an offensive, to the Zuni. Based on input and consultations with the Pueblo of Zuni, text has been included considering mitigations such as beneficial use of fish that are removed and Reclamation consulted with the FWS under Section 7 to make some adjustments to the preferred alternative. Based on those adjustments and 'tiers' that were added in the biological assessment (see Appendix O), mechanical removal is now a second 'tier' action, as other actions would be tried first as a 'first tier'. This may reduce the frequency of mechanical removal. Differences in the frequency of the mechanical removal of trout between alternatives are also addressed in this section of the EIS. Consultations continue with Tribes on potential mitigations through an agreement in process regarding non-native fish management.

13 WATER

13.1 CONSIDERATION OF CLIMATE CHANGE EFFECTS RELATED TO WATER SUPPLY REDUCTIONS, EVAPORATION, AND OPERATIONAL LEVELS OF LAKE POWELL

Summary Comment: Commenters emphasized the importance and requested the consideration of climate change effects (e.g., increased temperatures, droughts, etc.) related to water supply reductions, evaporation, seepage, and operational levels of Lake Powell.

Response: This EIS used 21 reconstructed historical hydrological traces that were reweighted based on the 112 traces to represent the best current understanding of what might happen because of climate change. Based on this analysis, the weights on the hydrological traces had a small effect on the aggregate performance but did not change the rankings of alternatives. This result suggests the relative performance of the alternatives would be consistent regardless of the uncertainty of the effects of climate change.

The Basin Study (Reclamation 2012) was peer reviewed and is the best available science regarding climate change projections in the Colorado River Study. The hydrological traces generated for the Basin Study were utilized as described in Section 4.16.1.2 and Appendix C. See also response to comment summary 2.14.

13.2 CONSIDERATION OF CLIMATE CHANGE IMPACTS ON WATER AVAILABILITY, INCREASED DEMAND, AND GREATER DEPLETION

Summary Comment: Commenters emphasized the importance and requested the consideration of climate change impacts (e.g., increased temperatures, droughts, etc.) on water availability, increased water demand (both diversion and consumptive), and greater depletion.

Response: Water depletion assumptions used for the LTEMP EIS represent the best available and documented data provided by and agreed to by the Basin States for use in CRSS modeling.

13.3 INFLUENCE OF TRIBUTARIES AND LAKE POWELL ON MAIN STEM AND LAKE MEAD SALINITY LEVELS

Summary Comment: Commenters inquired about the comparative salinity values and resulting influence of tributaries and Lake Powell on main stem and Lake Mead salinity levels.

Response: As addressed in the EIS in Sections 3.2 and 4.2, some tributaries, such as the Little Colorado River, are significant sources of salinity for the mainstem Colorado River. But, this is diluted as it enters the mainstem and moves downstream. There are also a number of smaller spring-fed tributaries that originate within the Grand Canyon reach, which tend to have very different physicochemical properties than the mainstem; however, their mean flows are so low that their contribution to water quality during base flow is not significant. For Lake Powell, broader patterns are described in the EIS; but, focus was placed on the forebay, since this is the

water that is released downstream. The salinity module of the CRSS RiverWare™ model was used to analyze changes in salinity concentration for Colorado River reaches from Lake Powell to Imperial Dam, which is located downstream of Hoover Dam and Lake Mead. The Salinity Control Act sets numerical criteria for salinity concentrations on the Colorado River. Results and analysis indicate that, regardless of alternative or operating conditions, salinity would not increase over time or exceed control criteria.

13.4 EDITORIAL COMMENTS

Numerous substantive editorial comments were submitted on sections in the DEIS related to water resources, including Sections 3.2, 4.2, and Appendix D. Most of these editorial comments focused on the specific wording of how Glen Canyon Dam would be operated to comply with existing laws and regulations related to water delivery, collectively known as the Law of the River. Where appropriate, the text of the EIS was modified to address the specific comments.

14 WILDLIFE

14.1 AVERTING THE RESPONSIBILITY TO PROTECT NATIVE SPECIES

Summary Comment: A commenter stated that DOI is averting its responsibility to protect native species because all of the alternatives would result in a decrease in native plant community cover. Special status wildlife species will also be impacted (i.e., every alternative causes losses of habitat for the Kanab ambersnail and every alternative threatens to negatively affect at least one other special status wildlife species). Also, all alternatives will cause wetland loss that will affect the northern leopard frog and Yuma clapper rail. Instead of attempting to create an alternative that prevents continued habitat loss, DOI is just attempting to slow the degree of loss. DOI is averting its legal responsibilities to protect endangered species and Grand Canyon National Park, instead of seeking real solutions.

Response: The purpose and need is consistent with the requirements of the Grand Canyon Protection Act and NPS Organic Act because it focuses on protection and preservation of park resources. Alternatives must meet those basic requirements. All alternatives perform similarly when evaluating effects to wildlife species, showing little difference among the alternatives (Tables 4.7-1 and 4.7-2), although the preferred alternative (Alternative D) shows a benefit to wildlife in general compared to the no action alternative (Alternative A), and Alternative D performed the best for vegetation condition overall and resulted in the least wetland loss. The potential benefits of the non-flow vegetation treatment experiment could not be modeled, but were addressed qualitatively in the EIS and would help to further improve vegetation condition. Alternative D was identified as the preferred alternative because it provided the best balance for protecting, mitigating and improve downstream resources.

14.2 HFE IMPACTS ON KANAB AMBERSNAIL

Summary Comment: Commenters stated that HFEs, including extended duration HFEs, could negatively impact the population of the Kanab ambersnail, a Grand Canyon endangered species. Recovery time of the ambersnail population and habitat scoured by HFEs can take 2.5 years and yet this effect was apparently not considered important to the development of Alternative D.

Response: Endangered and threatened species were considered in the LTEMP EIS analysis based on the best available science and modeling, while the FWS has been consulted throughout the preparation of the EIS. The purpose and need of LTEMP activities are consistent with the requirements of the Grand Canyon Protection Act and NPS Organic Act because they focus on the protection and preservation of park resources. Impacts to the Kanab ambersnail are addressed in Section 4.7.2.5, 4.7.3, and the recovery time of 2.5 years was stated in those sections and considered. Additional information is included in Appendix O (biological assessment) of the Final EIS. It should also be noted that new genetic information on the Kanab ambersnail indicates that it is no longer considered a distinct species and the FWS is considering a delisting process for this species.

14.3 OPERATE GLEN CANYON DAM IN A WAY THAT PROTECTS ALL WILDLIFE (INCLUDING LISTED SPECIES)

Summary Comment: A few commenters wanted the life and safety of all wildlife to be considered. They want the Glen Canyon Dam to be operated in a way that preserves wildlife. Wildlife, including listed species, need to be considered when making decisions on the future of the Grand Canyon. The purpose and need of the LTEMP should be to reverse past damage and prevent future damage to the species of Glen and Grand Canyons.

Response: Impacts on wildlife, including special status species, were considered in the LTEMP EIS in Section 4.7. The purpose and need of LTEMP activities are consistent with the requirements of the Grand Canyon Protection Act and NPS Organic Act because they focus on the protection and preservation of park resources. All alternatives must meet those basic requirements.

15 COMMENTERS, AFFILIATION, AND LOCATION WHERE RESPONSES TO COMMENTS ARE FOUND

An index presenting a list of individuals who submitted comments, their affiliated organizations (when provided), and the sections in this appendix where responses to issues raised in their comments is presented in Table Q-3. All individuals who provided a first or last name in their comment submittal to NPS's PEPC database or whose names were otherwise provided on comment letters submitted by other means are included. An affiliation was listed for an individual if it was clear from their submittal that the commenter was representing the organization and was not simply a member of the organization and commenting as an individual. The right-hand column presents the sections in this appendix where responses to substantive issues raised in commenter's letters are located.

TABLE Q-3 Commenter, Affiliation, and Location Where Responses Are Found

Commenter and Affiliation When Provided[a]	Sections Where Responses Are Found
Aaron, Kris	2.4; 2.13
Abate, Jo Ann	N/A[b]
Abbott, Gayle	2.4; 2.13
Abbott, Robert	3.2; 3.6
Abdel-Gawad, Aliaa	2.4; 2.13
Abrahamson, Dennis	N/A
Abshagen, WP	3.2; 3.6; 8.3
Adams , Mark	3.2; 3.6; 8.3
Adams, A.	2.4
Adams, Jon	2.4; 2.13
Adams, Mary	2.4; 2.13
Adams, Robert	N/A
Aderhold, Steven	2.4; 2.13
Adibi, Elise	2.4; 2.13
Aguirre, Elizabeth	N/A
Aguirre, Sonia	N/A
Ahearn, Mary Ann	2.4; 2.13
Ahrens, Christopher	2.4; 2.13
Aiken, Bianca	2.4; 2.13; 4.1.2; 7.3.1;; 11.3
Aiken, Edwin	2.4; 2.13
Aiken, Silas	2.4; 2.13; 4.1.2; 7.3.1; 11.3
Ainsley, Brian	2.4; 2.13
Akom, Denise	N/A
Alarie, Kim	N/A
Albanese, Dawn	2.4; 2.13
Albano, Tahyra	2.4; 2.13
Albert, Harrison	2.4; 2.13
Alcantara, Ivan	N/A
Alderson, George and Frances	2.4; 2.13

TABLE Q-3 (Cont.)

Alexander, Charles	N/A
Alford, Cassie	N/A
Allen, Charles	2.4
Allen, Donna	2.4; 2.13
Allen, III, Doug	2.4; 2.13
Allen, James	3.6
Allen, Johnnie	N/A
Allen, Mary	2.4; 2.13
Alloway, Richard	N/A
Altum, Angelika	N/A
Alvarez, David	2.4
Amaro, Gabriel	2.4
Amato, Julie	2.4
Ancel-Wisner, Annette	2.4; 2.13
Andersen, Brian	2.8
Andersen, Kelton (Utah Associated Municipal Power Systems)	2.6; 2.10
Anderson, Barry	2.4
Anderson, Dan	2.4; 2.13
Anderson, Dianne	2.4; 2.13
Anderson, Judith S	2.4; 2.13
Anderson, Karen	2.4
Anderson, Mona	2.4; 2.13
Anderson, Sylvia	2.4; 2.13
Anderson, Troy	3.2; 3.6; 8.3
Anderson, Wayne	2.4; 2.13
Anderson, William	2.4; 2.13
Andrew, Jeffrey	N/A
Andrews, Richard C.	N/A
Andrews, Rosalind	2.4; 2.13
Angel, Mary	N/A
Anton, Kathleen	2.4
Antuna, Martin	2.4; 2.13
Apolinar, Augustine	N/A
Arambula , Richard	3.2; 3.6; 8.3
Arbolaez, Fidel	2.4; 2.13
Archuleta , William	3.2; 3.6; 8.3
Arias, Elvira	2.4; 2.13
Arko Hargrove, Barbara	N/A
Armes, Hal	N/A
Armstead, Vetty	N/A
Armstrong, Leslie	2.4; 2.13
Arneson, Paul	2.4; 2.13
Arnold, Alan	2.4; 2.13
Arnold, Ben	2.4; 2.13
Arnold, Earl W. (Sespe Fly Fishers)	N/A
Artin, Thomas	2.8
Ary, David	N/A
Asher, Meredith	2.4
Ashton, Richard	2.4

TABLE Q-3 (Cont.)

Athavale, Anjali	2.4; 2.13
Atkins , Bettye	N/A
Atkins, Todd	N/A
Atwater, Chelsea	2.12
Auer, Patricia	2.4; 2.13
Aune , Brad	3.2; 3.6; 8.3
Aurigemma, Kaye	2.4; 2.13
Avins, Jeremiah	2.4
Ayres, Peter	2.4; 2.13
B, John	12.4
B, Peter	2.4
Babbitt, Susan	2.4
Babcock, Heather	2.1; 2.2; 2.8; 2.14; 13.1
Backlund , Stanley	3.2; 3.6; 8.3
Baclija, Martin	2.4; 2.13
Bacon, Patricia	N/A
Bader, Sandra	2.4; 2.13
Baecker, Grant	12.2
Baggerman, David	3.2; 3.6; 8.3
Bagnoli, Dana	3.2; 3.6
Bahn, Theodore	2.4; 2.13
Bahr, William	N/A
Baier, Mary Ann	2.4; 2.13
Bailey, Shayna	2.4; 2.13
Bails, Jean	2.4; 2.13
Bails, Kirk	2.4
Baker, Danny	N/A
Baker, John	2.4; 2.13
Baker, Ron	N/A
Baker-Smith, Gerritt and Elizabeth	2.4; 2.13
Balay, Joanne & Joseph	2.4; 2.13
Baldwin, Leland	N/A
Baley, Patricia	2.4; 2.13
Balfour, Michele	N/A
Balken, Eric	2.8; 2.14; 13.1
Balken, Eric (Glen Canyon Institute)	2.1; 2.2; 2.8; 2.14
Ball, Evelyn	2.4; 2.13
Ball, William	N/A
Ballard, Cynthia	N/A
Baltrip Balagas, Ayana	N/A
Banks , Jim	3.2; 3.6; 8.3
Banks, Janice	N/A
Banks, Wesley	2.4; 2.13
Bannon, Robert	12.2
Barbieri, Lynn	2.4; 2.13
Baresich, Dennis	2.4; 2.13
Barger, John	2.4; 2.13
Bariana, Ava	2.4; 2.13
Barker, Donald	N/A
Barker, Greg	2.8; 2.14

TABLE Q-3 (Cont.)

Barkley , David	3.2; 3.6; 8.3
Barkman, Jeff	N/A
Barlow, Coni	2.4
Barmann, Adriene	2.4; 2.13
Barnes, Alexander	2.4; 2.13
Barnes, Linda Sue	N/A
Barnett, Lance	N/A
Barondes, Lynda	N/A
Barr, Ford	2.4; 2.8; 2.13
Barradas, Carlos	2.4; 2.13
Barrett, Dorie	2.4; 2.10
Barrington, Tim	2.4
Barry, Karyn	N/A
Bartkowicz, Richard	2.4; 2.13
Bartleman, Mark	2.4; 2.13
Basford, Jerry	3.2; 3.6; 8.3
Bashore, Thomas	2.4; 2.13
Bass, Linda	N/A
Bates, Bryan	2.4; 2.11; 2.13
Batina, John	N/A
Battaly, Robert	2.4; 2.13
Battle, Adriana	N/A
Bauman, Joan-Marie	2.4; 2.13
Baxter, Lou	2.4; 2.13
Bayer, Robert	3.2; 3.6; 8.3
Beam, Stephanie	N/A
Beatini, Tom	2.4; 2.13
Beattie, Jane H	N/A
Bechtel, Paul	2.4; 2.13
Beck, Deborah	N/A
Beck, Kim	2.4; 2.13
Becker, Elaine	2.4; 2.13
Bedell, Diane	N/A
Begaye, Russell (The Navajo Nation)	4.2; 7.5; 8.1; 10.2; 10.8
Beil, William	2.4; 2.13
Belcastro, Bernadette	2.4; 2.13
Belcastro, Frank	2.4; 2.13
Bell, Don	N/A
Belles, Mark	N/A
Bello, D	2.4; 2.13
Bellows, David	N/A
Bender, Jerry	3.2; 3.6; 8.3
Bender, Kae	2.4
Bendixen, Kirsten	N/A
Benedetto, Mona Stephanie	N/A
Benford, Alan	2.4; 2.13
Benjamin, Frank	N/A
Bennett, E	3.2; 3.6; 8.3
Bennett, Faye	N/A
Bennett, Mary	2.4; 2.13

TABLE Q-3 (Cont.)

Bennett, Robert	2.4; 2.13
Bennion, Joseph	2.4; 2.13
Bennion, Lee	2.13; 4.1.2;; 12.2
Benson, Andy	2.4; 2.13
Benson, William	2.4; 2.13
Benware, BettyAnn	2.4; 2.13
Bergen, Joanne	N/A
Bergeron, Brad	2.4
Berglund, John	3.6
Bergstedt, Charlie	2.4; 2.13
Bernon, Douglas	2.4
Bernstein, Joel	2.4; 2.13
Bernstein, Laura Ann K	N/A
Bertani, Christy	2.4; 2.13
Berteaux, Elizabeth	2.4
Bessette, Wayne	2.4; 2.13
Bhattacharji, Lee	2.4
Bickel, Michael	2.4; 2.13
Biddle, Maxine	2.4; 2.13
Bieritz, David	N/A
Biggs, Susan	N/A
Billeaud, Theresa	2.4; 2.13
Bilodeau-Lanne, Michelle	N/A
Bilton, Gretchen	2.4; 2.13
Bilwin, Gina	2.4; 2.13
Bing, Donna	2.4; 2.13
Bircher, K Kay	2.4; 2.13
Bird, Paul	2.4; 2.13
Bishop, Cori	2.4; 2.13
Bishop, Norman	2.4
Blackwell-Marchant, Patricia	N/A
Blake, Frank	2.4; 2.13
Blanton, Robin	N/A
Blaustein, John	2.4; 2.13
Bleifeld, Neil	2.4; 2.13
Bloch, Mark	2.4; 2.13
Blombach, Ann	2.4; 2.13
Blome, Ronald	N/A
Bloxsom, Daniel	3.2; 3.6; 8.3
Boardman, Scott	3.2; 3.6
Bobb, Douglas	3.6
Bobnick, Jacqueline	N/A
Bocchino, Jackie	2.4
Boche, Philip	N/A
Bockino, Alida	2.4; 2.13
Bodine, Frank	2.4; 2.13
Boguske, Matthew	N/A
Boisvert, Chantal	2.4; 2.13
Bolen, Dk	2.4
Bollinger, Lesley	2.4

TABLE Q-3 (Cont.)

Bonds, John	2.5; 2.17; 3.2; 3.3; 3.4; 3.6; 8.3; 12.2
Boone, James	2.4
Boone, Jim	2.4; 2.13
Booth, Robert	2.4
Borie, Edith	2.4; 2.13
Boris, Donna	2.4; 2.13
Bornholtz, Gavin	2.4; 2.13
Borrelli, Silvana	2.4
Bortoletto, Federico	N/A
Boston, Lovie	N/A
Bottrell, Gregory	3.2; 3.6; 8.3
Boucher, J	2.4; 2.13
Boumali, Omar	N/A
Bowden, Joan	2.4; 2.13
Bowen, Mary Ellen	2.4; 2.13
Bowers Margarita	14.3
Bowers, Carla	2.4
Bowers, Robert	3.2; 3.6
Bowie, Martin	N/A
Boyce, Ashley	2.4
Boyce, Justin	2.4
Boyd, Kerry	2.4; 2.13
Boydston, Charlene	2.4; 2.13
Boyer, David	2.4; 2.13
Boynton, Robin	2.4; 2.13
Brachman, Phyllis	2.4; 2.13
Bradley, Kathy	2.4; 2.13
Bradley, Mark	2.4; 2.13
Bradley, Shari	N/A
Bradley, Stacey	2.4; 2.13
Bradshaw, Barbara	N/A
Bradshaw, Jacqui	N/A
Braithwaite, Georgia	2.4; 2.13
Bramblett, Sharon	2.4; 2.13
Brandt, Deborah	N/A
Brandt, Vicky	2.8
Brault, Robert	N/A
Breckenridge, Bonnie	2.4; 2.13
Breckenridge, Claudia	3.2; 3.6
Breedlove, Elizabeth	2.4; 2.13
Brehmer, Dianne	N/A
Breitenstein, Mark	3.2; 3.6; 12.2
Brenner, Jared	2.4; 2.13
Bridges, Linda	N/A
Brigham, Lawrence	2.4; 2.13
Brinker, Mary Jo	N/A
Brinkley, Mike	2.4; 2.13
Brochhagen, Ann	2.4; 2.13
Brocious, Pamela	2.4
Brockett, Peter	2.4; 2.13

TABLE Q-3 (Cont.)

Brockway, Barbara	2.4; 2.13
Broe, Paula	2.4; 2.13
Bromage, Joan	2.4; 2.13
Brookover, Cicely	3.2; 3.6; 8.3
Brooks , William	3.2; 3.6; 8.3
Brooks, Carrie	2.4; 2.13
Brooks, Dorothy	N/A
Brooks, Prudence	N/A
Brown, James	2.4; 2.13
Brown, Jessica	2.4; 2.13
Brown, Lolly	2.1; 2.2; 2.8; 2.14; 13.1
Browning, Henry	N/A
Bruce, John	2.4
Brunick, Cathy	2.4; 2.13
Brunson, Richard	3.6
Bruton, Babette	2.4; 2.13
Bryan, Karol	N/A
Bryant, Elizabeth	2.4; 2.13
Buck, Mary Lou	2.4
Budlong, Tom	2.1
Budziack, Thomas	3.6; 12.2
Buech, Heidi	2.4
Buell, Nancy	2.4
Bular, Ed	3.2; 3.6
Bullis, Robert	2.4; 2.13
Bunch, Eugene	N/A
Bundy , Jay	3.2; 3.6; 8.3
Burback, Heidi	2.4; 2.13
Burger, Nancy	N/A
Burgess, Wendy	2.4; 2.13
Burgett, Debbie	2.4; 2.13
Burk, Robert	N/A
Burke, Bryan	2.8
Burke, Maureen	2.4; 2.13
Burks, Paul	N/A
Burland, Marcia	2.4; 2.13
Burress, Edward	2.4; 2.13
Burstein, Mimi	2.4; 2.13
Burt, Barry	3.2; 3.6; 8.3
Buschatzke, Thomas (Arizona Department of Water Resources)	2.4; 3.6; 5.2; 8.3; 12.11; 13.1; 13.3, 13.4
Bushnell, Martha	2.4; 2.13
Buss, William	2.4; 2.13
Busse, Chris	2.4
Buszmann, Jeff	N/A
Butler, Sam	2.4; 2.13
Buttacavoli, Rhonda	2.4
Buvala, Ken	3.2; 3.6; 8.3
Byerley, Erica	2.4
Byland, John	N/A

TABLE Q-3 (Cont.)

Byrnes, Kelly	2.4
Byrum, Nancy	2.4; 2.13
C., Bob	3.2; 3.6; 8.3
Caballero, Luis	2.4; 2.13
Cacciapuoti, Anthony	2.4; 2.13
Cagey, Sharon	N/A
Calame, Jane	N/A
Caldwell, Pamela	2.4
Calhoun, Ashley	N/A
Calig, Charles	2.4
Caltagirone, Michael	3.2; 3.6; 8.3
Camp, Ward	3.2; 3.6; 8.3
Campbell, Allan	2.4; 2.13
Campbell, Grant (South Florida Audubon Society)	2.4
Campbell, Jacqueline	N/A
Campbell, Jerry	2.4; 2.13
Campbell, Nancy	2.4; 2.13
Campbell, Susan	N/A
Cannon, John	2.4; 2.13
Cano, Martha	2.4; 2.13
Canter, Linda	N/A
Cantor, Francine	2.4; 2.13
Caplin, Marilyn	N/A
Caputo, Michael	2.4; 2.13
Carley, Daniel	2.4; 2.13
Carlile, Carol	N/A
Carlson, J. Tyler (Mohave Electric Cooperative, Inc.)	2.4; 2.10
Carlson, Robin	N/A
Carlson, Sandy	2.4; 2.13
Carnahan, Michael	12.4
Carney, Marilyn	2.4; 2.13
Carolan, Daniel	3.2; 3.6; 8.3
Carpenter, Steven	2.4; 2.13
Carrasco Serrano, Grace	2.4; 2.13
Carrico, John	2.4; 2.13
Carrillo, Stephen	2.4; 2.13
Carrington, Martha	2.4; 2.13
Carroll, Celia (Wilderness Fly Fishers of Santa Monica)	2.5; 3.2; 3.3; 3.4; 3.5; 12.2
Carter, D.	2.4; 2.13
Carter, Michelle	2.4; 2.13
Case, Nicole (Northwest Public Power Association)	2.6; 2.10
Casey, Nancy	N/A
Cassens, Clarence	3.2; 3.6
Castri, Serenella	2.4
Caswell, Susan	N/A
Catches, Margaret	2.4
Catlin, Linda	2.4; 2.13
Caywood, Wayne	N/A
Cefola, Elaine	N/A
Chaffin, Claudia	2.4; 2.13

TABLE Q-3 (Cont.)

Chalfen, Karen	2.4
Chalker, Mikki	2.4; 2.13
Chambers, John	2.1; 2.2; 2.8; 2.14; 13.1
Chambless, Rochelle	2.4
Chang, Bill	2.4; 2.13
Chapman, Andrew	2.4
Chappell, Christina	2.4; 2.13
Chardon, Denise	2.4; 2.13
Chase, Linda	2.4; 2.13
Chasse, Rob	2.1; 2.2; 3.6
Chati, Janet	N/A
Chavet , Kent	3.2; 3.6; 8.3
Chelak, Mark	N/A
Chen, Allan	2.4; 2.13
Cherrington, Howard	2.4
Child, Katrina	2.4
Christ, Andrew	2.4; 2.13
Christensen, Kelly	3.6; 12.2
Christie, Tess	N/A
Christman, Margaret	2.4; 2.13
Christman, Mary	N/A
Christo, Jeffrey	N/A
Christopher, Bruce	2.4; 2.13
Christopher, Lucy	2.4; 2.13
Chunko, Mike	3.2; 3.6; 8.3
Chunko, Mike	3.2; 3.6
Chwalisz, Bart	2.4; 2.13
Claggett, Suzanne	2.4; 2.13
Claridge, Jeanne	2.4; 2.13
Clark, Carolyn	2.4; 2.13
Clark, James A. Jr.	2.4; 2.13
Clark, Pam	2.4
Clark, Todd	2.4; 2.13
Clark, Zulma	N/A
Clarke, Tom	2.4; 2.13
Claus, Carol	2.4; 2.13
Clayton, David	N/A
Clement, Susan	2.4
Cleveland, Al	2.5
Cling, Marvin	2.8
Clinton, 86001	N/A
Clough, Cyndi	2.4; 2.13
Coahran, Scott	N/A
Coates, Charles, Sr.	3.2; 3.6; 8.3
Cobb, Robert	2.4; 2.13
Cobb, Sandra	2.4; 2.13
Coble, Melvin	3.6
Coburn, Della	N/A
Coffee, Eileen	N/A
Cohen, Annelisa	N/A

TABLE Q-3 (Cont.)

Cohen, Daniel	2.4; 2.13
Cohen, David	N/A
Cohen, Francine	2.4; 2.13
Cohen, Howard	2.4; 2.13
Cohen, Judy	2.4; 2.13
Cohen, Sheara	2.4; 2.13
Cohen, Yoel	2.4; 2.13
Coleman, Timothy	2.4; 2.13
Colingsworth, Julia	N/A
Collins, Carol	2.4; 2.13
Collins, Jennifer	2.4; 2.13
Colten, Lora	2.4
Colton , Joseph	3.2; 3.6; 8.3
Columbia, James	2.4; 2.13
Colver, Frank	2.1; 2.2; 2.8; 2.14; 13.1
Colver, Matthew	2.1; 2.2; 2.8; 2.14; 13.1
Combes, Dale	N/A
Comella, John	N/A
Comer, Patrick	2.4; 2.13
Commarata, Anthony	2.4; 2.13
Conforti, Susan	2.4; 2.13
Conner, Kathleen	2.4; 2.13
Conner, Lisa	N/A
Conrad, Lori	2.4; 2.13
Conroy, Beverly	N/A
Conroy, Faith	2.4; 2.13
Conroy, James	2.4; 2.13
Conroy, Jim	2.4; 2.13
Cook, Barry	N/A
Cook, Charlotte	N/A
Cook, Jason	3.2; 3.6
Cook, Joy and Mike	N/A
Cook, Susan	N/A
Cook, Suzanne	2.4; 2.13
Cooley, Marian	2.4; 2.13
Coon, John	2.4; 2.13
Coonfield, Sherril	N/A
Coons, Kathryn	2.4; 2.13
Cooper, Charlene	2.4; 2.13
Cope, Denys	2.4; 2.13
Copeland, Sue	N/A
Copenhaver, Patricia	N/A
Coppotelli, Heide Catherina	2.4; 2.13
Corby, Kathleen	2.4; 2.13
Cordaro, Tom	2.4
Cordero, David and Ann	2.4; 2.13
Corkey, Peter	N/A
Cornelia, Jared	2.4; 2.13
Corriere, Jim	N/A
Corry, Ronit	N/A

TABLE Q-3 (Cont.)

Costa, Lynn	2.4; 2.13
Cottingham, Charlie	N/A
Couch, Sandra	N/A
Coulter, D. Mountainhawk	3.2; 3.6; 8.3
Coulter, David	3.2; 3.6; 8.3
Counterman, Michael	12.2
Courtney, Andy	3.2; 3.6
Courtright, Anne	2.4; 2.13
Covell, Sandi	2.4; 2.13
Cowan, Christina	2.4; 2.13
Cowin, Caryn	2.4; 2.13
Cox, Chadwick	2.4; 2.13
Cox, Jerry	2.5
Cracchiolo, Clara	N/A
Craig, Ann	2.4; 2.13
Cramer, Marilyn	2.4; 2.13
Cresseveur, Jessica	2.4; 2.13
Creswell, Sandra	N/A
Croft, Samuel	N/A
Crosland, Richard	2.4; 2.13
Cross, Dave and Rita	2.4; 2.13
Crow, Benita	2.4; 2.13
Crowley, John	N/A
Cruger, Kurt	N/A
Crumpacker, Barb	N/A
Crumpacker, Nancy	2.4; 2.13
Cuddy, William	2.4; 2.13
Cuff, Kermit	2.4; 2.13
Cui, Michael	N/A
Culmore, Matthew	N/A
Cummings, Joan	N/A
Cunningham, David	3.2; 3.6; 8.3
Curtis, Helen	2.4; 2.13
Cutting, Ken	12.4
Cwyk, Francine	3.2; 3.6
Cyzner, Steven	2.4
Czingula, Christian	N/A
D, Mary	2.4; 2.13
Daetz, Douglas and Gisela	2.4; 2.13
Dagney, Orysia	N/A
Dailey, Susan	2.4; 2.13
Dalla, John	2.4; 2.13
Daly, Charles	2.4; 2.13
D'Ambra, John	N/A
Daniel, Kian	N/A
D'Anne, Denise	N/A
Dannels, Paul	3.2; 3.6; 8.3
Dannevig, John	N/A
Dasher, Don	2.4; 2.13
Dashiell, James	2.4; 2.13

TABLE Q-3 (Cont.)

Dashiell, Mannyson	2.4; 2.13
Dashiell, Marilyn	2.4; 2.13
Davidson, Paul and Mary	N/A
Davis , Alan	3.2; 3.6; 8.3
Davis, Eleanor-Ann	2.4; 2.13
Davis, Glenn	2.4; 2.13
Davis, Lisa	2.4; 2.13
Dawson-Barker, Joelle	N/A
De La Torre, John	2.4; 2.13
Dean, Nancy	N/A
DeAngelis, Victor	N/A
Deborah, N/A	N/A
Decell, Kerri	2.1; 2.2; 2.8; 2.14; 13.1
Deese, Donna	N/A
DeGraw, Catherine	2.4
Deihl, Richard	2.4
Del Valle, Javier	N/A
Delaney , Patrick	N/A
Delaney, Janet	2.4; 2.13
Delehant, Raymond	2.4; 2.13
Deltognoarmanasco, John	2.4; 2.13
DeMars, Matthew	2.4; 2.13
Demonbrun, Carl	N/A
Demorest, Cynthia	2.4; 2.13
Denis, Laurie	2.4; 2.13
Denissen, Paula	N/A
Dennedy, Frank, Daniel	3.2; 3.6; 8.3
Denninger, Sandra	N/A
Dervin, John	N/A
Deskins, Merrill	2.4
Desroches, Don	N/A
Devine , Timothy	3.2; 3.6; 8.3
Devlin, Summer	N/A
deVos, James (Arizona Game and Fish Department)	3.2; 3.6; 3.9; 5.1; 9.3; 12.3
Diamante, Nina	N/A
DiBlasi, Dawn	2.4
Dickinson, Amanda	N/A
Dietriech, Kevin	3.2; 3.6; 8.3
Dillman, Michael	2.4; 2.13
Dillon, John (Grand Canyon River Outfitters Association)	2.13; 8.5; 12.1; 12.2
Dills, Robert	2.4; 2.13
Dimock, Brad	2.4
Dimock, Donald	N/A
Dingleberry, Pat	2.4
Dingman, S. Lawrence	2.4; 2.13
DiRenzo, Jennifer	2.4; 2.13
Dishion, Catherine	N/A
Diss, Marybeth	2.4
DiVall, Nelson	N/A

TABLE Q-3 (Cont.)

Dixon, Joyce	2.4; 2.13
Doherty, Jeanne	2.4
Dombroski, Ed	N/A
Dominiak, Adam	2.4
Donnelly, Stephen	2.4; 2.13
D'Onofrio, Adam	2.4; 2.13
Donovan, Elaine	2.4; 2.13
Dorfman, Ellen	2.4
Dorn, John	2.5; 2.17; 3.2; 3.3; 3.4; 3.6; 8.3; 12.2
Dorr, Kelly	N/A
Dougherty, Janet	2.4; 2.13
Downes, Susan	2.4; 2.13
Downing, Larry	N/A
Dowson, Eleanor	2.4; 2.13
Drahos, Ronald	2.4; 2.13
Drake, Mercy	N/A
Drake, Tracy	2.4; 2.13
Dresben, Fred	3.2; 3.6; 8.3
Dreyer, Daniel	N/A
Driessen, Lynn	2.4; 2.13
Driskell, Shelley	2.4; 2.13
Drummond, William (Mid-West Electric Consumers Association)	2.1
Duckworth, Michael	12.4
Duffus, Kathleen	N/A
Dujon, Phyllis	2.4; 2.13
Dunaetz, Ron	N/A
Dunbrack , Jan	N/A
Duncan, Kimberly	2.4; 2.13
Duncan, Pat	2.4
Duncan, Renee	2.4
Dunkley, Julianne	2.4; 2.13
Dunn, Elmo	2.4; 2.13
Dunn, Timothy	2.4; 2.13
Dunn, W. Ronald (Strawberry Anglers Association)	3.2; 3.6; 8.3
Dunwell, Nancy	2.4; 2.13
Durrer, Mary	N/A
Durrum, Kathy	N/A
Dutschke, Stephen	2.4; 2.13
Dzhonova, Iveta	2.4; 2.13
Eames, Mary	2.4; 2.13
Early, Lance	2.4; 2.13
Earnshaw, Shinann	2.4
Eaton, Kathleen	2.4; 2.13
Eaton, Lorena	2.4
Ebert, Erik	2.4
Eckerle, Lissa	N/A
Eddy-Lee, Gladys	2.4; 2.13
Edmonson, Michele	N/A
Edmunds, Alicia	N/A

TABLE Q-3 (Cont.)

Egger, Kathleen	2.4; 2.13
Eglin, Jennifer	2.5; 2.17; 3.2; 3.3; 3.4; 3.6; 8.3; 12.2
Eichel, Richard	2.4; 2.13
Eisenberg, Andrea	N/A
Eive, Gloria	2.4; 2.13
Elkins, E	2.4; 2.13
Ellenbecker, Marvin	N/A
Elliot, Nan	2.4; 2.13
Elliott, Lynn	2.4; 2.13
Elliott, R	2.4
Ellis, Julie	N/A
Elson, Adam	2.4; 2.13
Embry, Judith	2.4; 2.13
Emerson, Chelsea	2.4; 2.13
Emery, Susan	2.4; 2.13
Enger, Carolyn	N/A
Engler, Pamela	2.4; 2.13
English, Jeff	12.4
Entress, Greg	3.6; 12.4
Epstein, Harry	N/A
Epstein, Kelly	2.4; 2.13
Erb, Cheryl	N/A
Erbs, Lori	2.4; 2.13
Ernst, Cathie	2.4
Escobar, Victor	2.4; 2.13
Espinoza, Debra	2.4; 2.13
Estel, Karen	2.4
Estrada, Jennifer	2.4; 2.13
Evans, Bronwen	2.4; 2.13
Ewert, Henry	N/A
Ewing, Peter	2.4; 2.13
Ewoldsen, Brooke	N/A
F, Annette	14.3
Fabian, Bill	2.4; 2.13
Faegre, Dirk	2.4
Fahey, Keith	2.4
Fairchild-Ehm, Audrey	N/A
Faires, APRIL	N/A
Falcone, Janet	2.4; 2.13
Falcone, Pamela	N/A
Falconer, Russ	3.2; 3.6; 8.3
Fallon, Laura	2.12
Fantano, Theodore	2.4
Farber, Carol	2.4; 2.13
Farmer, Bonnie	2.4; 2.13
Fary, Jim	N/A
Fasano, Marianne	2.4; 2.13
Fear, Marge	N/A
Fearey, Donna	2.4; 2.13
Fehr, Richard	2.4

TABLE Q-3 (Cont.)

Fei, Eddijohn	2.4
Fenley, Bette-Burr	N/A
Ferguson, Charlene	N/A
Ferguson, David	3.2; 3.6; 8.3
Ferguson, Roy	3.2; 3.6; 8.3
Ferman, Pam	N/A
Fermin, Christina	N/A
Fernandez, Daniel	2.4; 2.13
Fickling, Karl	2.4; 2.13
Fidler, Vicki	N/A
Fiederer, Conrad	N/A
Fiedler, David	2.4; 2.13
Field, Patrick	2.4
Fielder, Linda	2.4
Fields, Mark J	2.4
Finch, Bonnie	N/A
Fine, Cindy	2.4; 2.13
Fink, Christine	N/A
Fink, Harry	2.4; 2.13
Finkelstein, David	2.4; 2.13
Finkelstein, Sheldon	2.4; 2.13
Finley, Diane	N/A
Finley, Patricia	2.4; 2.13
Finn, Peter	2.4; 2.13
Fisch, Greg	2.4; 2.13
Fischer, Elaine	2.4; 2.13
Fischer, Fred	2.4; 2.13
Fish, Richard	2.4; 2.13
Fisher, Judith	2.4
Fisher, Michael	N/A
Fishleder, Sam	N/A
Fitzpatrick, John	2.4; 2.13
Fladager, Susan	2.4; 2.13
Flanagan, Marianne	2.4; 2.13
Flanigan, Kevin (New Mexico Interstate Stream Commission)	5.2; 6.4.12; 8.11; 13.2, 13.4
Fleetwood, Patricia	N/A
Fleischer, Tim	2.4; 2.13
Fleming, Nancy	2.4
Fletcher, Carol	2.4; 2.13
Fletcher, Ken	3.2; 3.6; 8.3
Flickinger, R Charles	2.4; 2.13
Flores, Regina	2.4; 2.13
Flory, John	2.1; 2.2; 2.8; 2.14; 13.1
Floyd, Joel	2.4; 2.13
Fluker, Richard	2.4
Fogarty, Geraldin	N/A
Foley, Doris	N/A
Follansbee, Meghan	N/A
Fonken, Miryam	2.4

TABLE Q-3 (Cont.)

Forbes, Doreen	2.4
Ford, Michael	2.4; 2.13
Forlie, Kai	2.8
Forschner, Jillian	2.4; 2.13
Forwand, Arlene	N/A
Fosburgh, Eric	2.4; 2.13
Fost, Rebecca	2.4
Foster, Dawn	2.4; 2.13
Fouche, David	2.4; 2.13
Fox, Cinnamon	N/A
Fox, Lyndsey	2.1; 2.2; 2.8; 2.14; 13.1
Fraikor, Fred	3.2; 3.6; 8.3
Franchi, Irena	2.4; 2.13
Francis, Stuart	N/A
Franckowiak, Paul	N/A
Franco, Merrill	2.4; 2.13
Frank, Henry	2.4
Frank, Mitzi	2.4
Frankel, Myrna	2.4; 2.13
Frantz-Crafton, Candy	N/A
Franzmann, Paul	2.4; 2.13
Fraser, Bonnie	2.4; 2.13
Fraser, Evelyn	2.4; 2.13
Frazee, Janis	2.4; 2.13
Fredricks, Judith	2.4; 2.13
Frerichs, Joan	N/A
Frey, Brenda	N/A
Frey, Lawrence	2.4; 2.13
Friedel, Diane	2.4; 2.13
Friedman, Thomas	N/A
Friehauf, Mike	3.2; 3.6; 8.3
Friel, Bernard	2.4
Friel, Bernard P.	2.4
Fromowitz, Allen and Carol	N/A
Fuessel, Chere	N/A
Fugate, John	3.2; 3.6; 8.3
Fugina, Vincent	3.2; 3.6; 8.3
Fuller, George	2.4; 2.13
Fuller, Roy	2.4; 2.13
Fulmer, James	2.4
Furno, Saragh	N/A
Fusi, David	3.2; 3.6; 8.3
G, C.	2.4; 2.13
G, Derek	2.2; 3.6; 12.2
Gabriel, Robert	2.4; 2.13
Gaines, Marsha	2.4; 2.13
Galindo, Thomas	3.2; 3.6; 8.3
Gallo, Gina	N/A
Gambriel, John	2.4; 2.13
Gannon, Kristine	N/A

TABLE Q-3 (Cont.)

Garber, Barbara	2.4; 2.13
Garcia, Jeffery	2.4; 2.13
Gardner, Chris	2.4
Garey, JG	2.4; 2.13
Garnas , D	3.2; 3.6; 8.3
Garratt, Liz	2.4; 2.13
Garrity, Coleen	2.4; 2.13
Garton, Katie	2.4; 2.13
Garvey, Patrick	2.4
Gates, Joanne	N/A
Gauthier, Dale	3.6
Gay, Larry	2.4; 2.13
Geis, Emery	3.2; 3.6; 8.3
Gelbart, Susannah	N/A
Gelles, Kat	2.4; 2.13
Gensler, Donna	N/A
George, Thomas (State of Colorado, Colorado Water Conservation Board)	2.2; 2.5; 2.15; 2.20; 6.1.2; 6.1.3; 6.4.12; 6.4.13; 8.6; 8.7; 8.8; 8.12; 10.8; 12.6; 13.4
George, Thomas (Arizona, California, Colorado, Nevada, New Mexico, Utah, Wyoming & Upper Colorado River Commission)	2.2; 2.5; 2.19; 2.20; 3.6; 5.1
Gerak, Edward (Buckeye Water Conservation & Drainage District)	2.2; 2.9; 3.5; 5.2; 11.1
Gerber, Steve	12.2
Gerstenfeld, Judith	3.2; 3.6
Ghirardelli, Susan	2.4
Giantomasi, David	N/A
Giasson, Bertrand	N/A
Gibbon, Jocelyn	2.4; 2.14
Gibson, Jody	2.4; 2.13
Giere, Linda	2.4; 2.13
Gilbert, Don	N/A
Gill, Stephanie	N/A
Gillies, Dan	N/A
Gilligan, Michael	2.4; 2.13
Gilliland, Charles	2.4
Gilmore, Myra	2.4; 2.13
Ginn, Kenneth	2.4; 2.13
Girard, Brian	N/A
Girvin, Darrylin	2.4; 2.13
Gist, Sally	2.4
Gitlin, Alicyn (Sierra Club - Grand Canyon Chapter)	2.8; 2.14; 3.1; 3.4; 3.8; 7.1; 8.3; 13.1; 14.1; 14.2
Glascock, Katherine	N/A
Glass, Perri	N/A
Glasser, Mark	N/A
Gleaton, Dianne	N/A
Glenn, Alice Ann	2.4; 2.13
Glessing, Kathryn	N/A
Gliva, Stephen	2.4; 2.13
Gloeckler, Bill (Grand Canyon Whitewater)	12.1; 12.2

TABLE Q-3 (Cont.)

Gloyd, Jan	N/A
Glynn, John	2.4; 2.13
Godich, Marcia	2.4; 2.13
Goebel, Fred	2.4; 2.13
Goebel, Lawrence	N/A
Goertz, Harry	3.2; 3.6; 8.3
Goetschius, Lascinda	N/A
Goforth, Kathleen (U.S. Environmental Protection Agency, Region IX)	N/A
Golden, Gene	N/A
Golden, Kathleen	2.4
Goldstein, Arthur	N/A
Goldstein, Dale	2.4; 2.13
Gonzales Nielsen, Rosemarie	N/A
Gonzalez, Joy	N/A
Gonzalez, William G	2.4; 2.13
Goodale, Margaret	2.4; 2.13
Goodrich, D'Arcy	2.4; 2.13
Goodwin, Elizabeth	2.4; 2.13
Goodwin, Margaret	N/A
Goodwin, Tom	3.2; 3.3; 3.6
Gorrin, Eugene	2.4; 2.13
Gorsetman, Mark	2.4; 2.13
Gottlieb, Olga S.	2.4; 2.13
Gould , Michael	N/A
Gould, Jo Anne	N/A
Gover, Pat and Gary	2.4; 2.13
Goyette, Marc	N/A
Goyette, Margo	2.4
Grabar, Christine	N/A
Grace, George	2.4; 2.13
Grace, Harry	2.4; 2.13
Grace, Howard	N/A
Graffagnino, Mary Ann and Frank	2.4; 2.13
Graham, James	2.4; 2.13
Graham, James	3.2; 3.6
Graham, Jim	2.4; 2.13
Grames, Patricia	2.4; 2.13
Granakis, George	2.4
Granlund, Fred	2.4; 2.13
Grasso, Jen	N/A
Gray, Heather	2.4; 2.13
Gray, Richard	3.2; 3.6
Gray, Tony	N/A
Green, Jesse	2.4; 2.13
Greene, Minna	N/A
Greenfield, Cariln	2.4; 2.13
Greenhalgh, Diana	2.4; 2.13
Greenhill, Barry	N/A
Greenlee, Philip (International Federation of Fly Fishers)	2.5; 3.2; 3.3; 3.4; 3.6; 12.2

TABLE Q-3 (Cont.)

Gregory, Paul	N/A
Gregory, Probyn	3.2; 3.6; 8.3
Greif, Kevin	2.4
Grenard, Mark Hayduke	2.8
Grenci, Ann	N/A
Gresko, Andrew	N/A
Grierson, Phillip	2.4; 2.13
Griffin, Byron	2.4; 2.13
Griffin, Leah	2.4; 2.13
Griffiths Vega, Joan	2.4; 2.13
Grisez, Bernard	2.4; 2.13
Griswold, Dave	2.4; 2.13
Griswold, Tracy	2.4; 2.13
Gritsch, Maria	2.4; 2.13
Grom, Jeff	N/A
Groshardt, Joanne	N/A
Gross, Linda	N/A
Gross, Todd	N/A
Grove, Earl	2.4; 2.13
Grove, Stephen	2.4; 2.13
Grover, Justin	3.2; 3.6; 8.3
Grover, Justin	2.4; 2.13
Grube, Mary Alyce	2.5; 2.17; 3.2; 3.3; 3.4; 3.6; 8.3; 12.2
Grzanna, Maureen	N/A
Guard, Mary	2.4; 2.13
Guckian, Michael	2.1; 2.2; 2.8; 2.14; 13.1
Guenther, Lavaune	N/A
Guile, Roger	3.6
Guinnup, David	2.4; 2.13
Guion, William	2.4; 2.13
Gullam, Paul	2.4; 2.13
Gunning, John	2.4; 2.13
Gunter, Karlene	2.4; 2.13
Gunther, Ken	2.4; 2.13
Gutierrez, Laura	2.4; 2.13
Gwinn, Carol	N/A
H, Dennis	2.4; 2.13
Haag, James	2.4; 2.13
Haarr, Lars	N/A
Haber, Steven	2.4; 2.13
Hackel, Helena	N/A
Hackett, Marcia	2.4
Hackman, Jim	2.1; 2.2; 2.8; 2.14; 13.1
Hackney, Stephen	2.4; 2.13
Haertel, Melissa	2.4; 2.13
Hafer, Sarah	2.4; 2.13
Hahn, Robert	N/A
Hahn, Theodore	N/A
Hahus, Donna	N/A
Haines, Thomas	2.4; 2.13

TABLE Q-3 (Cont.)

Haley, Patty	N/A
Hall, Beth	2.4
Hall, Diana	2.4; 2.13
Hall, James	2.4; 2.13
Hall, Janice	N/A
Hall, Sue	N/A
Hallett, Mark	2.4; 2.13
Halloran, Michael	N/A
Halpain, Dale	N/A
Hamill, John (Trout Unlimited; International Federation of Fly Fishers)	2.5; 3.2; 3.3; 3.4; 3.6; 5.1; 8.3; 9.3; 12.2; 12.3
Hamilton, Lynn (Grand Canyon River Guides, Inc.)	2.13; 4.1.2; 7.3.1; 9.2; 10.3; 11.3
Hamilton, Roy	N/A
Hammer, Brian	N/A
Hammer, Dorothy	N/A
Hammerstad, Charles	3.2; 3.6; 8.3
Hampton, Hugh	N/A
Hand, David	3.2; 3.6
Handelsman, Robert	2.4; 2.13
Hanlon, K	2.4; 2.13
Hansen, Greg	3.2; 3.6; 8.3
Hansen, Jan	2.4; 2.13
Hanson, Bruce & Michelle	2.4; 2.13
Hanson, David	N/A
Hanson, Norman	2.4
Hanson, Norman	N/A
Harden, Ronald	2.4; 2.13
Harding, Steve	3.2; 3.6
Hardt, Vincent	2.4; 2.13
Hardy, Wallace	3.2; 3.6
Harker, William	2.1; 2.2; 2.8; 2.14; 13.1
Harland, Donald	2.4; 2.13
Harmer, Jill	2.4
Harmon, Amy	2.4; 2.13
Harmon, Chris	3.2; 3.6; 8.3
Harmon, Gail	2.4; 2.13
Harned, Kristin	2.4; 2.11; 2.13
Harper, Barbara	2.4; 2.13
Harper, Dennis	3.2; 3.6; 8.3
Harper, Rebecca	2.4; 2.13
Harper, Robin	2.4; 2.13
Harrington, Warren	N/A
Harris, Candice	2.4; 2.13
Harris, Debra	2.4; 2.13
Harris, Gail	N/A
Harris, James	2.4; 2.13
Harris, Susan	2.4; 2.13
Harrison, David	2.4; 2.13
Harrison, Marie	2.4; 2.13
Hartman, Jenifer	2.4; 2.13

TABLE Q-3 (Cont.)

Hartman, Todd	2.4; 2.13
Harvey, Richard	3.2; 3.6; 8.3
Haskell, Michael	2.4; 2.13
Haslip, James	N/A
Hatch, Steve (Hatch River Expeditions)	12.1; 12.2
Hathaway, Susan	2.4; 2.13
Hauenstein, Cathleen	2.4; 2.13
Haugen, David	2.4; 2.13
Haverfield, Heather	2.4; 2.13
Hawkins, Phillip	3.2; 3.6
Haycock, Robert	2.4; 2.13
Haydock, John	3.6; 8.3
Hayes, Christine	2.4
Hayes, Tim	N/A
Haymans, Deanna	2.4; 2.13
Hays, Dennis	2.4; 2.13
Hays, Helen Logan	2.4
Hayworth, Steven	2.4; 2.13
Hazen, Alona	2.4; 2.13
Head, Kris	2.4; 2.13
Heald , Douglas	3.2; 3.6; 8.3
Heap, Francesca	2.4
Heathman, Susan	2.4; 2.13
Heck, David	3.2; 3.6
Hedgcock, Charles	2.4; 2.13
Hedges , Bill	3.2; 3.6; 8.3
Hediger, JoAnn	N/A
Heffron, Joshua	2.4; 2.13
Hegedus, Barbara	N/A
Heide, Andra	2.4; 2.13
Heilmann, James	2.4; 2.13
Heinle, Janet	2.4; 2.13
Heinly, Bridgett	2.4; 2.13
Heinz, Guenter	2.4; 2.13
Helmer, Kathleen	2.4; 2.13
Helmick, Rick	3.2; 3.6; 8.3
Helstien, Sherie	2.4
Hendry, Dawn	2.4
Hengesbaugh, Matt	2.4; 2.13
Henninger, Maryann	2.4; 2.13
Henry , David	3.2; 3.6; 8.3
Henry, Amy	2.4
Henzel, William	2.4; 2.13
Herman, Dorothea	N/A
Hernandez, Patricia	2.4; 2.13
Herrera, Desiree	2.4; 2.13
Herrera, Lois	2.4; 2.13
Herrick, Michael	2.4; 2.13
Herrman, Chris	N/A
Hertz, Richard	3.6

TABLE Q-3 (Cont.)

Herzog, Robert	N/A
Hessler, Charles	2.4; 2.13
Hessler, Charles	2.4; 2.13
Hewelt, Karen	N/A
Heyde, Christiane	N/A
Heyneman, Amy	2.4; 2.13
Heywood, Austin	N/A
Hibbs, Howard	3.2; 3.6
Hicks, Robert	2.4; 2.13
Hiestand, Nancy	2.4; 2.13
Hill, Gerry	3.2; 3.6; 8.3
Hill, Marilyn	2.4; 2.13
Hill, Mark	N/A
Hillard, Dale	2.4; 2.13
Hilliard, Donald	2.4; 2.13
Hills, Richard	2.14
Hilton, Bill	2.4; 2.13
Hinderberger, Sacha	2.4
Hines, Marianne	N/A
Hinkle, Connie	2.4; 2.13
Hinkley, David	2.4
Hinton, Terry	N/A
Hirschenbein, Randy	2.4; 2.13
Hirschman, Mark	2.4; 2.13
Hiscox, Tom	3.2; 3.6; 8.3
Hissom, Terry	N/A
Hlat, Mike	2.4; 2.13
Hoagland, Linda	2.4; 2.13
Hobbs, Joan	N/A
Hobbs, Pat	2.4; 2.13
Hodie, Jake	2.4; 2.13
Hoenigman, Vince	2.4; 2.13
Hoey, Roseanne	2.4
Hofer, Ricardo	2.4; 2.13
Hoffman, Chrissy	2.4; 2.13
Hoffman, Jane	2.4; 2.13
Hoffman, Janice	N/A
Hoffman, Lincoln	2.4; 2.13
Hoffman, Marc	2.4; 2.13
Hofheins, Paul	2.4; 2.13
Hogan, Mary	2.4
Hogan, Randolph	2.4
Holbert, Cynthia	2.4; 2.13
Holbo, Chadwick	3.2; 3.6; 8.3
Holbrook, Jon	2.4; 2.13
Holbrook, Scott	3.2; 3.6
Holder, Gary	2.4; 2.13
Holland, Brett	2.4; 2.13
Holland, J.	2.4; 2.13
Hollington, Jason	N/A

TABLE Q-3 (Cont.)

Hollinrake, Mark	2.4; 2.13
Holman, Clarisse	N/A
Holmes, David	2.4; 2.13
Holt, Arve	2.4; 2.13
Holthouse, Dave	2.4; 2.13
Holtzman, Dorothy	2.4
Holtzman, Julie	2.4
Honanie, Herman (The Hopi Tribe)	2.9; 4.1.1; 8.1; 10.1; 10.7, 10.8
Honigsblum, Alexander	2.4; 2.13
Honore, Stephanie	2.4; 2.13
Hope, Phillip	2.4; 2.13
Hopkins, Larry	2.4
Hoppe, Lindy	N/A
Horn, Stephanie	2.4; 2.13
Horowitz, Laura	2.4; 2.13
Horton, Deanna	N/A
Horton, Derek	N/A
Horzepa, Judith	N/A
Hosea, David	2.4
Hottenstein, Tara	2.4; 2.13
Hougaard, David	3.2; 3.6; 8.3
Houston, Meghan	2.4; 2.13
Hovorka, Ah	N/A
Howard, Bryan	N/A
Howard, Lex	2.8
Howard, Nancy	2.4; 2.13
Howell, Dorothy (Payson Fly Casters Club)	2.5; 2.17; 3.2; 3.3; 3.4; 3.6; 8.3; 12.2; 12.4
Howland, Cynthia	2.4; 2.13
Howse, Peter	2.1; 2.2; 2.8; 2.14; 13.1
Hubbard, James	2.4; 2.13
Hubbell, Linda	2.4; 2.13
Hubbs, Dawn (Hualapai Nation)	4.2; 4.3; 8.2; 10.4; 10.5; 10.6; 10.8; 12.5
Hudgins, Jerry	2.4; 2.13
Huerta, John	2.4
Huffman, Shelia	N/A
Hughes, Barbara	N/A
Hughes, Laurel	2.4; 2.13
Hughes, Lisa	2.4; 2.13
Huie, Jonathan	N/A
Hulsey, Tamara	2.4; 2.13
Hunnicutt, Joan	N/A
Hunt, Timothy	3.2; 3.6; 8.3
Hunter, Stanton	N/A
Huntoon, Kristin	2.4; 2.13
Hurabiell, John	3.2; 3.6; 8.3
Hurley , Pat	3.2; 3.6; 8.3
Hurliman, Heidi	2.4
Hus, Richard	3.2; 3.6; 8.3
Hutchinson, Bryce	N/A
Hutchinson, Terrance	N/A

TABLE Q-3 (Cont.)

Huycke Mccall, Ruth	N/A
Hyams, Mark	2.8
Hyde, David	2.8; 2.14; 13.1
Ibenthal, Brian	3.2; 3.6; 8.3
Ihle, John	2.4; 2.13
Iltis, Michael	2.4; 2.13
Imar, Delaney	2.4; 2.13
Imlay, Marc and Alice	2.4; 2.13
ImMasche, Sonia	2.4
Ingemi, Lynn	N/A
Ingham, Lula Kay (Katie)	2.4
Ingraham, Carolyn	2.4; 2.13
Ionina, Kate	2.4; 2.13
Iovino, Teresa	2.4; 2.13
Iseri, Martin	N/A
Iverson, Steve	2.4; 3.13
Jackman, Rob	2.5; 2.17; 3.2; 3.3; 3.4; 3.6; 8.3; 12.2
Jackson, Harold	N/A
Jackson, James	2.4; 2.13
Jackson, Sue	2.4; 2.13
Jackson, Warren	2.4; 2.13
Jacob, Lynn	N/A
Jacobel, Richard	2.4; 2.13
Jacobi, Allen	N/A
Jacobson, Susan	2.1; 2.2; 2.14
Jamal, Kate	2.4; 2.13
James, Leslie (Colorado River Energy Distributors Association)	1.1; 1.2; 1.3; 1.4; 1.5; 2.1; 2.2; 2.6; 2.7; 2.10; 2.14; 2.19; 2.20; 3.3; 3.8; 4.1.1; 4.1.2; 4.1.3; 5.2; 6.1.2; 6.2.1; 6.2.3; 6.3.2; 6.4.1; 6.4.2; 6.4.3; 6.4.4; 6.4.5; 6.4.7; 6.4.11; 6.4.14; 6.5.1; 6.6.1; 6.7; 7.2; 7.3.2; 8.8; 8.9; 9.4; 10.3; 12.9
James, Nadine	2.4
Jansen, Sam	2.8; 2.13; 2.14; 4.1.2; 7.3.1; 11.3
Janzen, Gayle	2.4; 2.13
Jardine, Guy	3.2; 3.6; 8.3
Jarvis, Michael	N/A
Jasper, Alan	2.4; 2.13
Jastromb, Virginia	N/A
Jeavons, John	N/A
Jeffries, Stephen	3.2; 3.6; 8.3
Jeka, Lynn (Western Area Power Administration)	1.2; 1.3; 5.1; 6.13; 6.23; 8.4
Jennings, Joanna	N/A
Jennings, Scott	2.4; 2.13
Jennings, Sid	N/A
Jensen, Margaret	2.4
Jensen, Sterling	3.2; 3.6; 8.3
Jobe, Laura	2.4
Jobling, Catherine	2.4
Johannsen, Mary	2.4; 2.13
Johnsen, David	2.4; 2.13

TABLE Q-3 (Cont.)

Johnsen, Harold	2.4; 2.13
Johnson, Arnold	N/A
Johnson, Brett	3.2; 3.6
Johnson, Bruce	2.4
Johnson, Chessa Rae	2.4; 2.13
Johnson, Deborah	N/A
Johnson, Douglas	2.4
Johnson, G.G.	2.4; 2.13
Johnson, Jay	N/A
Johnson, Karen	N/A
Johnson, Martha	2.4; 2.13
Johnson, Rich	3.2; 3.6; 8.3
Johnson, Russell	2.4; 2.13
Johnson, Todd	N/A
Johnson, Vicki	2.4; 2.13
Johnson, Viginia	N/A
Johnston, Philip	2.4; 2.13
Jones , Martin	3.2; 3.6; 8.3
Jones, Andrea	2.4; 2.13
Jones, Lauel	2.4
Jones, Terri	2.4
Jones, Tina	N/A
Jonkosky, Cassandra	N/A
Jonkosky, Charles	N/A
Joos, Sandra	2.4; 2.13
Jordan, Catherine	2.4
Jordan, Kris	3.2; 3.6; 8.3
Jordan, S.	2.4
Jordan, Yashoda	N/A
Jorgensen, Bob	N/A
Jorgensen, John	2.4; 2.13
Judy, Paul	N/A
June, Ana	2.1; 2.2; 2.8; 2.14; 13.1
Jussaume, Carol	2.4; 2.13
Justice, Cheryl	2.4; 2.13
Justice, Robert (Electrical District #7)	N/A
K, Matt	N/A
K,J.	N/A
Kacser, Linda	N/A
Kadar, Zach	2.4; 2.13
Kaiser, Terry	3.2; 3.6; 8.3
Kalman, Janet	2.4; 2.13
Kalscheuer, Maria	N/A
Kane, Leah	2.4; 2.13
Kane, Linda	N/A
Karanjawala, Eric & Armin	2.4; 2.13
Karns, Gary	N/A
Karr, Sheena	2.4; 2.13
Karrs, David	3.2; 3.6; 8.3
Kartman, Sue	2.4; 2.13

TABLE Q-3 (Cont.)

Kashinski, David	2.4; 2.13
Kastel, Diane	2.4; 2.13
Katten, DC	N/A
Katz, Ron	2.4; 2.13
Kaufman, Andrea	2.4; 2.13
Kaufman, Barry	2.4; 2.13
Kaufman, Joan	2.4
Kaufman, Melanie	N/A
Kava, John	3.2; 3.6
Kawa, Sandra	2.4; 2.13
Kawszan, Karen	2.4; 2.13
Kaye, Jackie	2.4; 2.13
Kearns, Peter	N/A
Keck, Robert	2.1; 2.2; 2.8; 2.14; 13.1
Keegan, Barbara	2.4; 2.13
Keegan, Helen	N/A
Keenan, Thomas	N/A
Keeton, Hank	2.4; 2.13
Keim, Lisa	2.4; 2.13
Keiser, Robert	2.4
Keith, Kristin	2.4; 2.13
Kellermann, Thomasin	N/A
Kelley, Dorinda	N/A
Kelly, Diane	2.4
Kelly, Donell	N/A
Kelly, Steve	3.6
Kelly, Wayne	2.4; 2.13
Kelm, Kathleen	2.4; 2.13
Kemper, Erik	N/A
Kendrick, Cindy	2.4; 2.13
Kendy, Arthur	2.4; 2.13
Kent, Ellen	N/A
Kentfield, Maren	N/A
Kepner, Sethsue	2.4; 2.13
Kerivan, Andrea	N/A
Kerman, Paul	2.4; 2.13
Kern, Alicia	2.4; 2.13
Kerwell, Cherrie	2.4; 2.13
Kerwin, Patrick	N/A
Kessler, Susan	2.4; 2.13
Kettelhut, H.	N/A
Key, Laurence	2.4; 2.13
Keymolent , Claudia	2.4; 2.13
Khalsa, Mha Atma S.	2.4; 2.13
Kibler, JK	2.4
Kieffer, Ramsay	2.4
Kiel, Edward	3.2; 3.6
Kilpatrick, Leslie	2.4; 2.13
Kincaid, Ted	2.4; 2.13
Kindel, Karen	2.4

TABLE Q-3 (Cont.)

King, Kathy	N/A
King, Kelly	N/A
King, Ruth	N/A
King, Stephen	N/A
Kingsley, Robert	2.4; 2.13
Kinkead, Timothy	N/A
Kirk, Nancy Jo	2.4; 2.13
Kirkpatrick, Mary	2.4
Kirsh, Julie	N/A
Kite, Richard	2.4; 2.13
Kittle, Pat	2.4; 2.13
Kitts, Michele	N/A
Kizer, David	2.8; 2.14; 11.5
Klass, David	2.4; 2.13
Klass, David	2.4; 2.13
Klein, Mark	2.4; 2.13
Kline , Regan	3.2; 3.6; 8.3
Klinkhamer, Trevor	12.2
Klipfel II, George	2.4; 2.13
Knickerbocker, Al	N/A
Kniess, Betty	2.4; 2.13
Knight, Robert	N/A
Knoll, Carolyn	2.4; 2.13
Knorr, Carl	2.4; 2.13
Knuth, Dean	2.4; 2.13
Koch, James	2.4; 2.13
Koch, Joann	2.4; 2.13
Koch, Susanne	N/A
Koeser, Leland	N/A
Koessel, Karl	2.4; 2.13
Koivisto, Ellen	2.4; 2.13
Kolessar, Gregg	N/A
Komisarof, Jeff	N/A
Konzen, Susan	2.4; 2.13
Korec, Karen	2.4
Kosec, Dawn	2.4; 2.13
Koterba, Michael	2.4; 2.13
Kraft, Tessa	2.4; 2.13
Krai, Kevin	3.2; 3.6
Kramarz, Karen	2.4
Kramer, Eileen	2.4; 2.13
Kramer, Gavin	2.4; 2.13
Kramer, Grant	2.4
Kramer, Laura	2.4; 2.13
Krasnoff, Joshua	N/A
Krause, Doug	2.4; 2.13
Krause, Roger	3.2; 3.6; 8.3
Krause, William	2.4; 2.13
Krehbiel, Robb	2.4; 2.13
Krell, Elinore	2.4; 2.13

TABLE Q-3 (Cont.)

Krieger, Gena	2.4; 2.13
Kring, Juli	2.4; 2.13
Krone, Jeannene	2.4; 2.13
Krueger, David	2.4; 2.13
Krumpos, Steven	3.2; 3.6; 8.3
Krupa, Dave	N/A
Kubik, Cathy	N/A
Kuciej, Walter	2.4; 2.13
Kuhn, Kerry	2.4; 2.13
Kulka, Wally	3.2; 3.6; 8.3
Kuppler, Curtis	2.4; 2.13
Kusick, Paul	N/A
Kust, Melina	2.8
Kuter, Ann	N/A
Kuykendall, Gregory	3.2; 3.6
La Falce, Stephen	3.2; 3.6; 8.3
La Falce, Stephen (Trout Unlimited - Grand Canyon Chapter)	2.5; 3.2; 3.3; 3.4; 3.6; 8.3; 12.2
La Falce, Stephen (Trout Unlimited - Arizona Council)	2.5; 3.2; 3.3; 3.4; 3.6; 8.3; 12.2
Labasco, Christopher	2.4; 2.13
LaBranche, Laura	3.2; 3.6; 8.3
Lack, Phil	2.4
Lackey, Mercedes	3.6
LaCognata, Dale	2.4
Lacy, Sharon	2.4; 2.13
Ladd, Larry& Karen	2.4; 2.13
Ladimer, Martin	2.4; 2.13
Lafleur, Steven	2.4; 2.13
LaFour, Liz	N/A
Lago, Don	N/A
Lagonegro, Sean	2.4
Laieski, Caleb	2.4; 2.13
Lair, Jennifer	2.4
Lam, Ofelia	2.4; 2.13
LaMaack, Larry (Wyoming Municipal Power Agency)	2.6; 2.11; 2.13
Lamb, Patricia	2.4
Lambert, Howard	N/A
Lamiquiz, David	N/A
Lamons, Kristina	2.4; 2.13
Land, Martha	2.4; 2.13
Landry, Michael	3.2; 3.6; 8.3
Landry, Michael	3.2; 3.6; 8.3
Lane, Debra	2.4; 2.13
Lane, Troy	2.5; 2.17; 3.2; 3.3; 3.4; 3.6; 8.3; 12.2
Lanfranchi, LJ	2.4; 2.13
Lange, Elena	N/A
Lange, Marlena	2.4; 2.13
Lanka, Mike	2.4; 2.13
Lantry , Gavin	3.2; 3.6; 8.3
Lanus, Howard	N/A

TABLE Q-3 (Cont.)

Lanzetta, Dante	2.4; 2.13
LaPlaca, Lisa	2.4; 2.13
LaRoche, David	2.4
Larsen, Lance	3.2; 3.6; 8.3
Lash, Cal	2.8
Lashaway, Lisa	2.4
Lasley, Barbara	2.4; 2.13
Latona, Jaron	2.4; 2.13
Latta, George	2.1; 2.2; 2.8; 2.14; 13.1
Lausmann, Vance	2.4; 2.13
LaVonne, Nadine	N/A
Lawler, Lynn	N/A
Lawrence, Christopher	N/A
Lawrence, Pat	2.4
Lawson, Barbara	N/A
Layfield, Elizabeth	2.4; 2.13
Lazor, John	2.4; 2.13
Lea, Susan	2.4
Leal-McBride, Odilia	N/A
Learmann, Prisca	2.4; 2.13
LeClair, Peg	2.4; 2.13
Ledger, Patrick (Arizona Electric Power Cooperative, Inc.)	2.1
Lee, Madeleine	N/A
Lee, Miree	2.5; 2.17; 3.2; 3.3; 3.4; 3.6; 8.3; 12.2
Lee, Robert	2.4; 2.13
Lee, Virginia	2.4; 2.13
Leeuw, Lyn	N/A
Lehmann, Andre	2.1; 2.2; 2.8; 2.14; 13.1
Leichter , Lew	3.2; 3.6; 8.3
Leifker, M.	3.2; 3.6; 8.3
Leland, Lora	2.4; 2.13
Lemkuil, Rita	N/A
Lenchner, Nicholas	2.4; 2.13
Lenz, Andrew	2.4; 2.13
Leo, Carlos	2.4
Lesser, Rob	2.4; 2.13
Leve, Kristin	2.4; 2.13
Levesque, Paul	2.4; 2.13
Levin, Jon	2.4; 2.13
Levine, Lynn	N/A
Levitus , Walt	3.2; 3.6; 8.3
Levy, Linda	2.4
Lewis, O	2.4; 2.13
Lewis, Rita	2.4; 2.13
Lewis, Sherman	2.4; 2.13
Lewis, Tom	N/A
Liaudat, Claudia	N/A
Lichtenberger, Wayne	3.2; 3.6; 8.3
Liebeskind, Al	2.4

TABLE Q-3 (Cont.)

Lieder, Cecilia	N/A
Liesche, Kenneth	2.4; 2.13
Liggio, Eleanor	2.4; 2.13
Lilling, Glenda	2.4; 2.13
Lindsay, Brenda	N/A
Lindsay, Leslie	2.4; 2.13
Linna, Patricia	N/A
Lipsey, Joseph	2.4; 2.13
Lipsky, carol	2.4
Lish, Jeannine	2.4; 2.13
Liske, Patricia Ann	2.4
Liss, Mary	2.4; 2.13
Little, Dennis, Jr.	N/A
Little, Roy	3.2; 3.6; 8.3
Littlefield, Joan	N/A
Litwin, Linda	N/A
Livingston, Deborah	2.4; 2.13
Llewellyn, Suzanne	N/A
Lo, Jen	N/A
LoCicero, Robert	2.4
Lockett, Jennifer	2.4; 2.13
Locklear, Clyde	2.1; 2.2; 2.8; 2.14; 13.1
Logan, Newton	3.2; 3.6; 8.3
Lojo, Rosemary	N/A
Lolli, Mark	2.4; 2.13
Long, Dave	N/A
Long, Ernest	2.1; 2.2; 2.8; 2.14; 13.1
Long, Judith	N/A
Loomis , Rea Ann	2.4
Loosli, Ed (The Wildlife Trust)	2.4
Loper, Brigitte	2.4; 2.13
Lorentz, Marcel	N/A
Lotak, Justin	2.4; 2.13
Love, Mary	2.4; 2.13
Lowans, Jennifer	2.4; 2.13
Lowery, Joanne	2.4; 2.13
Lucas, Mary	2.4; 2.13
Luddon, Barbara	2.4; 2.13
Lueck, Donna	2.4; 2.13
Lundgren, Scott	2.4; 2.13
Lupenko, Andy	2.4; 2.13
Lupori, Stacy	2.4; 2.13
Lusby-Denham, Anne	2.4
Lusche, Jim	3.2; 3.6; 8.3
Luttich, Stu	2.4; 2.13
Luzier, Maresa	N/A
Lynch, Doris	2.4
Lynch, Frances	2.4; 2.13
Lynch, John	N/A

TABLE Q-3 (Cont.)

Lynch, Robert (Irrigation and Electrical Districts Association of Arizona)	2.3; 2.6; 2.10; 2.11; 2.21; 8.10; 11.1; 11.2; 11.4; 12.10
Lyon, R. Terry	N/A
Lyons, Kathi	2.4; 2.13
M., Henry	2.4; 2.13
MacAlpine, Barbara	2.4; 2.13
Macan, Edward	2.4; 2.13
MacArthur, June	N/A
MacDonald, John	2.4
Maciel, Marie	2.4; 2.13
Mackay, Leslie	2.4; 2.13
MacKenzie, Michelle	2.4; 2.13
Mackin, Tom (Coconino Sportsmen)	2.4
MacLeod, Dianna	2.4; 2.13
MacRaith, Bonnie	2.4; 2.13
MacRobbie, Todd	3.6
Madden, Kevin	3.2; 3.6
Magallon, Katie	N/A
Magee, W.L.	3.2; 3.6; 8.3
Makinen, Marvin	N/A
Mallett, Barbara	N/A
Malloy, Jerry	2.1; 2.2; 2.8; 2.14; 13.1
Malone, Michael	2.4; 2.13
Maloney, Liam	N/A
Malven, Tania	2.4
Manderscheid, B.	13.1
Mang, J.	2.4; 2.13
Mangrum, Carl	3.2; 3.6
Mangum, Laurie (St. George Energy Services)	2.4; 2.10
Mangus, Tracey	2.4; 2.13
Manka, Joann	2.4
Mannering, Natalie	2.4; 2.13
Manresa, Howard	2.4; 2.13
Mansfield, Tim	12.4
Marano, Gina	2.4; 2.13
Marasco, Summer	2.4; 2.13
Marchello, Linda	2.4
Marckini, David and Julia (First United Methodist Church)	2.4
Marcus, Marilyn	2.4; 2.13
Margulis, Elise	N/A
Mark, Robert	2.4; 2.13
Markham, William	N/A
Marks, J.B.	N/A
Marquis, Sharon	N/A
Marrs, Cynthia	2.4; 2.13
Marsden, Michael	3.2; 3.6; 8.3
Marsett, Robert	N/A
Marsh, David	3.2; 3.6; 8.3
Marsh, Sherry	N/A

TABLE Q-3 (Cont.)

Marshall, Linda	2.4
Marshall, Robert	N/A
Martin, Chase	2.4
Martin, Drew	2.4; 2.13
Martin, Gerry	N/A
Martin, Joanna	N/A
Martin, Joel	3.2; 3.6; 8.3
Martin, Michele	2.4; 2.13
Martinez, Brittany	2.4; 2.13
Martinez, Janie	N/A
Martinez, Ora Marek (The Navajo Nation)	4.2; 7.6; 8.1; 10.2; 10.7; 10.8
Martinez, Rebecca	2.4; 2.13
Martini, Denise	2.4; 2.13
Marvick, Vicki	2.4; 2.13
Marvin, Cindy	N/A
Maschke, Nicole	N/A
Maseda-Gille, Sheila	2.4; 2.13
Massey, Carolyn	2.4; 2.13
Mastri, Francis	2.4; 2.13
Matejka, Harry	2.4; 2.13
Matelski, Lauren	2.4; 2.13
Mathis, Leanne	2.4; 2.13
Mathis, Marty	2.12
Matsui, Vicky	2.4; 2.13
Mattes, Dale	2.4; 2.13
Mattis, Henry	N/A
Matusik, Barbara	2.4; 2.13
Maynard, Bruce	2.4
Maynard, Linda	N/A
Mazzuca, R	2.4
McAdoo, Hosea	N/A
McAlister, Kevin	2.4; 2.13
McAllister, Bud	2.4; 2.13
McAllister, Robert	2.4
McAlpine , Emily	2.4
McBride, Nancy	2.4; 2.13
Mccarthy, Shirley	2.4; 2.13
McCarty, Jesse Louis Henry	N/A
McClow, John (State of Colorado)	2.2; 2.5; 2.15; 2.20; 6.1.2; 6.1.3; 6.4.12; 6.4.13; 8.6; 8.7; 8.8; 8.12; 10.8; 12.6; 13.4
McClung, Judy	N/A
McConnell, David	3.2; 3.6; 8.3
McConnell, Suzanne	N/A
McCormic, Lori	N/A
McCormick, Molly	2.4; 2.22
McCreary, Jan	2.4; 2.13
McCulloch , Arch	2.4
McCulloch, Samuel	N/A
Mccurdy, Robert	3.6
McDaniel, Barbara	N/A

TABLE Q-3 (Cont.)

McDaniel, Jared	2.8
McDonald, Barbara	2.4; 2.13
McDonald, Brian	3.6
McDonald, Carolyn	2.4; 2.13
McDonald, Kim	N/A
McDonald, Stacey	2.4
McFall, Cynthia	N/A
McFarland, Brian	2.4; 2.13
McFee, Matt	N/A
McGaughey, Mary	N/A
McGilligan, Micky	N/A
McGillivary, M	N/A
McGlone, Colleen	2.4; 2.13
McKee, Wendy	2.4; 2.13
McKibben, Michael	3.2; 3.6; 8.3
McKinnie, Robert	N/A
Mclaughlin, Dagmar	2.8
McLaughlin, Michael	3.2; 3.6; 8.3
McLean, Patricia	N/A
McLeod, Roderick	N/A
McMahon, Lally	2.1; 2.2; 2.8; 2.14; 13.1
McManus, Veronica	2.4
McMillan, Sharon	2.4
McMullen, Colleen	2.4; 2.13
McNeil, Kerry	2.4; 2.13
McPherson, Tom	N/A
McQueen, Harry	2.4
McVie, Christina	2.4; 2.13
McWilliams, Glen	2.4; 2.13
Mecke, Mike	2.4
Medina, Rachel	2.4; 2.13
Medlock, Richard	2.4
Mee, Diane	N/A
Mee, William (Agua Fria Village Association)	2.4; 2.13
Meehan, Ellie	2.4
Meeker, Helen	2.4; 2.13
Meeker, Tobias	2.8
Meeks, Mark	2.4
Meham, Owen	N/A
Mehle, Anthony	2.4; 2.13
Meinerding, Tony	N/A
Melby, Jane	N/A
Mellica, Jason	2.8
Menasco, Mika	N/A
Mendel, Chris	2.4; 2.13
Mendes, Ruth	2.4
Mendieta, Vince	2.4; 2.13
Mendousa, Tony	2.4; 2.13
Menyuk, Paula	N/A
Mercante, Ron	2.4

TABLE Q-3 (Cont.)

Mercieca, Charles (International Assoc. of Educators for World Peace)	N/A
Merideth, Dennis	N/A
Merk, Michael	N/A
Merki, Stefan	2.5; 12.2
Mernitz, Richard	3.2; 3.6
Merrick, Diane	N/A
Merrigan, Anita	N/A
Merrill, Jim	2.22
Messer, Gretchen	2.4; 2.13
Metelica, Nikita	2.4; 2.13
Mettitt, B	N/A
Metzler, Michael	3.2; 3.6; 8.3
Meuer, Rita	N/A
Meute, Nancy	2.4; 2.13
Meyer, Douglas	2.4; 2.13
Meyer, Roger	N/A
Meyers, Beth	N/A
Mignella, Amy (Arizona Tribal Energy Association)	2.3; 2.7; 2.21; 12.5
Miles, Robert	2.4; 2.13
Miles, Robert	3.2; 3.6
Miller, D Rex	2.4
Miller, Ed	2.4
Miller, Joe (Gila Trout Chapter 530 Trout Unlimited)	2.5; 2.17; 3.2; 3.3; 3.4; 3.6; 8.3; 12.2
Miller, Kathleen	3.2; 3.6; 8.3
Miller, Mark	3.2; 3.6; 8.3
Miller, Pamela	2.4; 2.13
Miller, Robert	2.4; 2.13
Miller, Susan	2.4; 2.13
Miller, Travis	2.4; 2.13
Milley, John	3.2; 3.6; 8.3
Milligan, Douglas (Salt River Project)	2.1; 2.7; 2.8; 2.10; 2.11; 2.13; 4.1.1; 5.2; 6.1.8; 6.2.2; 6.2.3; 6.4.5; 6.4.7; 6.4.10; 6.4.11; 6.6.1; 6.7; 10.2; 10.3; 11.4
Millis, Eric (Utah Division of Water Resources)	8.9
Milonas, Nikolaos	2.4; 2.13
Minchuk, Gene	N/A
Minert, Carolyn	2.4; 2.13
Minich, Chris	2.4; 2.13
Mink, Daniel	2.4; 2.13
Minsky, Nina	N/A
Mitchell, Crystal	2.4
Mitchell, Michael	2.4; 2.13
Mitchell, Ruby	2.4; 2.13
Mitchell, Yolanda	2.4; 2.13
Mizel, Monroe	2.5
Mock. Randall (Randy)	2.4; 2.13
Modarelli, David	2.4; 2.13
Moe, Darrick (Minnesota Rural Electric Association)	2.10

TABLE Q-3 (Cont.)

Moffatt, James	N/A
Moffatt, James	N/A
Moffit, Ian	3.2; 3.6; 8.3
Moir, Dolie	N/A
Molling, Corrine	N/A
Monaghan, Dina	N/A
Monfredini, Janet	N/A
Monie, Sherry	2.4; 2.13
Monroe, James R	2.4; 2.13
Monson, Michael	2.8; 2.14
Monson, Todd	N/A
Montelongo, Monica	N/A
Montoro, Ernest	N/A
Moody, Richard	2.4; 2.13
Moon, Peggy	2.4; 2.13
Moore, Ariel	2.4; 2.13
Moore, Chris	2.5; 3.6; 12.2
Moore, Chris	2.4; 2.13
Moore, Greg	3.2; 3.6
Moore, Lucy	N/A
Moore, Malc	N/A
Moore, Matt	2.4
Moore, Nancy	2.4; 2.13
Moore, Robert	N/A
Moore, Thomas	N/A
Moorehead, Elisabeth	2.4; 2.13
Mooz, William	2.4
Morales, Susan	N/A
Moran, Patricia	N/A
Morebellob, Sam	3.2; 3.6; 8.3
Moreira, Rui	2.4; 2.13
Morel, N/A	2.4
Morello, Phyl	2.4
Morgan, Edward	2.4; 2.13
Morgan, Julie	N/A
Morgan, Michelle	N/A
Morgan, Sarah	2.4; 2.13
Morin , Inez	2.4; 2.13
Moritz, Robert	N/A
Morris, John	3.2; 3.6; 8.3
Morris, Lynn	N/A
Morris, Peter	3.2; 3.6
Morris, William	2.4; 2.13
Morrison, N	2.4; 2.13
Morrow, James	3.2; 3.6; 8.3
Mosca-Clark, Vivianne	N/A
Mosel, Sharon	N/A
Moser, Rich	N/A
Moshier, Katharine	N/A
Mothley, Drucilla	N/A

TABLE Q-3 (Cont.)

Motz, Mary	2.4; 2.13
Moulton, Jamie	2.8
Mourant, Wanda	N/A
Moyer, Steve (Trout Unlimited)	2.5; 3.2; 3.3; 3.4; 3.6; 8.3; 12.2
Mudrick, Stephen	2.4; 2.13
Mueller, Ray	2.8; 2.14
Mugglestone, Lindsay	2.4; 2.13
Mulholland, Jane	N/A
Mullen, Charles	2.4
Munar, Dwayne	2.4; 2.13
Munday, Sherrie	2.4
Mundine, Jennifer	N/A
Munsell, Steven	2.4
Murchison, Mary	2.4
Murdoch, Sarah	N/A
Murphy, Brian	3.6
Murphy, Dacia	2.4
Murphy, Daniel	2.4; 2.13
Murphy, John	3.2; 3.6; 8.3
Muss, Jeff	2.4; 2.13
Myers, Jillyn	2.4; 2.13
Myers, Stephen	N/A
Myers-Davis, Alan	N/A
MYl, David	3.6
Mylrea, Mary Ellen	2.4; 2.13
NA[c] (Arizona Raft Adventures LLC, Arizona)	2.5; 12.4
NA, Aaron	2.4; 2.13
NA, Adam	2.4; 2.13
NA, Cameron	3.6
NA, Charleen	2.4; 2.13
NA, Darina	N/A
NA, Karen	N/A
NA, Kristine	2.4; 2.13
NA, Martha	2.4; 2.13
NA, Michelle	2.4; 2.13
NA, NA (Arizona River Runners)	2.12; 12.1
NA, Nick	N/A
NA, Paul	N/A
NA, Peter	N/A
NA, Robert	2.4
NA, Ronald	N/A
NA, Shannin	2.4; 2.13
NA, Shawn	N/A
NA, Tom	2.4
NA, Victor	2.4; 12.2
NA, Wendy	N/A
NA, NA (Western River Expeditions)	2.4; 3.7; 9.1; 12.1; 12.2
NA, NA (Petition)	3.2; 3.6; 8.3
Naciri, Nour	2.4; 2.13
Naegele, Alice	N/A

TABLE Q-3 (Cont.)

Nagel, Clinton	2.4; 2.13
Nahill, Brad	2.4; 2.13
Naidich, Sandra	N/A
Naples, Jean	2.4; 2.13
Nappi, Glenn	2.4; 2.13
Nazzaro, Alan	2.4; 2.13
Neal, Stacy	2.4
Nearing, Sue	N/A
Nebergall, Bradford (Tri-State Generation and Transmission Association, Inc.)	2.1; 2.2; 2.3; 2.7; 2.9; 2.10; 2.19; 3.2; 4.1.3; 4.2; 5.2; 6.4.6; 6.4.8; 6.4.9; 7.3.3.; 8.9; 10.1; 14.2
Nedeau, E. James	2.4; 2.13
Neff, Laura	2.4; 2.13
Nelson, B.	2.4; 2.13
Nelson, Bob	2.4; 2.13
Nelson, David	2.4; 2.13
Nelson, Dennis	2.4; 2.13
Nelson, Don	3.2; 3.6; 8.3
Nelson, Jared	2.5
Nelson, Justin	3.2; 3.6; 8.3
Nelson, Robert	3.2; 3.6; 8.3
Nemko, Roy	N/A
Neste, George	2.4; 2.13
Neste, Lisa	2.4; 2.13
Netti , Steve	3.2; 3.6; 8.3
Neumann, Nancy	2.4; 2.13
Newman, Eric	N/A
Newman, Ricki	2.4; 2.13
Nichols, Carmen	N/A
Nichols, Nathaniel	2.4; 2.13
Nicholson, Jane	2.4
Nicolai, Nicola	2.4; 2.13
Nielsen, Leonor	N/A
Niemiec, Michael	2.4; 2.13
Nieters, Lenore	2.4; 2.13
Nimkin, David (National Parks Conservation Association & Grand Canyon Trust)	2.4; 2.13; 6.1.5; 7.3; 10.1; 10.3
Nitido, Vincent	2.5; 2.17; 3.2; 3.3; 3.4; 3.6; 8.3; 12.2
Noble, Bruce	N/A
Nochimson, Martha	2.4; 2.13
Nolan, Antoinette	2.4; 2.13
Noll, Fred	2.4
Noon, Gail	N/A
Norbury, Christopher	2.4; 2.13
Nord, Randall	2.4; 2.13
Nordberg, Hella	2.4; 2.13
Norden, Michael	2.4
Norman, John	2.4
Norris, Dick, Jr	2.4; 2.13
Novak, Nancy	2.4; 2.13
Novak, Trina	2.4; 2.13

TABLE Q-3 (Cont.)

Novkov, Russell	N/A
Nowack, Laura	N/A
Nowell, Jerry	3.2; 3.6
Nowicki, Susan	N/A
Noyes, Alan	2.8
Nudi, Floyd	2.4; 2.13
Nunez, Stephanie	N/A
Nunn, Tom	3.2; 3.6; 8.3
Nussbaum, Rhoda	2.4; 2.13
Nutini, Michael	2.4; 2.13
Nylen, Eric	2.4; 2.13
O, Ryan	N/A
Oakes, Dorothy	2.4; 2.13
Oakley , Jane	N/A
Oates, Judy	N/A
Oates, Tim	N/A
Oba, Peggy	2.4; 2.13
Obert, Leonard	N/A
Obr, Brooks	2.4; 2.13
O'Brien , lEE	3.2; 3.6; 8.3
O'Brien, Laura	2.4; 2.13
O'Connell, John	2.4
OConnor, Dan	2.4
O'Connor, Susan	2.4; 2.13
ODear, Elizabeth	2.4
Odom, Cassandra	N/A
O'Donnell, Richard	N/A
Ogella, Edith	N/A
Ogrosky, Wendell	3.2; 3.6; 8.3
Ohara, Stanley	3.2; 3.6; 8.3
Ohlendorf, Carol	2.4; 2.13
OKeefe, Alice	2.4; 2.13
Olander, Alan	2.4; 2.13
Olch, Jonathan	3.2; 3.6; 8.3
Oldfield, Barbara	N/A
Olivares, Yvonne	2.4
Olsen, Donna	2.4
Olson, Bruce	N/A
Olson, Jason	3.2; 3.6; 8.3
Olson, Lynn	2.4; 2.8; 2.13
Ommen, Elizabeth	N/A
Orcholski, Gerald	2.4; 2.13
O'Reilly, Patricia	2.4
Orlinski, Patricia (West Valley Neighborhoods Coalition)	2.4
Orr, Jenne	2.4
Osada, Susan	2.4; 2.13
Osborn, Carole	2.4; 2.13
Osborne, Kenneth	2.4; 2.13
OSteen, Karen	2.4; 2.13

TABLE Q-3 (Cont.)

Ostler, Don (Upper Colorado River Commission)	2.19; 4.1.1; 6.3.1; 6.4.12; 6.4.13; 6.4.14; 6.5.1; 8.8; 10.3
Ostopoff, Christine	2.4
Ostrander, William, Jr	2.4; 2.13
Ostwinkle, Stephen	3.6
Ouellette, Tracy	2.4; 2.13
Outland, Jennifer	2.13
Overton, Steve	2.4; 2.13
Owen, Cheryl	2.4
Owens, Hilery	2.4
Owens, Mary	2.4; 2.13
Ozias, Julie	2.4; 2.13
Pace, Ann	N/A
Packer, Patti	2.4; 2.13
Padula, P.S.	2.8
Paige, Richard	N/A
Paisley, Lorna	N/A
Pakaln, Laura	2.4; 2.13
Paley, Leon	2.4; 2.13
Palmer, Carol	N/A
Pannaman, Stanley	2.4
Panteah, Val (Pueblo of Zuni)	2.7; 3.3; 4.1.1; 10.1; 10.8; 12.10
Panza, Mike	N/A
Papesch, Peter	2.4
Pappas, Robin	N/A
Paradise, Brian	2.4
Parker, Delores	2.4; 2.13
Parker, Jin Adams	2.4; 2.13
Parker, Larry	3.2; 3.6
Parker, Mark	3.2; 3.6
Parker, Patricia	2.4
Parkins, Janet	2.4; 2.13
Parks Antonio, Mary Anne	2.4
Parus, Christine	N/A
Paschel, Richard	2.4
Pasqua,John	N/A
Patten, Robin	2.4; 2.13
Patton, Therese	2.4; 2.13
Pauls, Terry	2.4; 2.13
Pawlowski, Vincent (Association for the Tree of Life)	2.4; 2.13
Paxton, G.	2.4; 2.13
Pearlman, Karen	2.4; 2.13
Pecha, Richard	N/A
Pehrson, Danny	N/A
Pelleg, Josh	N/A
Pellegrino, Colby (Southern Nevada Water Authority)	4.1.3; 5.2; 8.8; 8.12; 10.1; 13.3; 13.4
Peltzer, Bryan	3.6; 12.4
Pence, Joanne	N/A
Pender, Jacqueline	2.4; 2.13
Percy, Patrick	N/A

TABLE Q-3 (Cont.)

Perdios, Dan	2.4
Perez, Thomas	2.4; 2.13
Perkins, Guy	2.4; 2.13
Perkins, Marie	2.4; 2.13
Perry, Saul	N/A
Person, Wayne	2.4; 2.13
Peteinaraki, Maria	N/A
Peters, Kathleen	2.4; 2.13
Peters, Robert	N/A
Petersen, Diane	2.4; 2.13
Petroni, John	N/A
Pettibone, Jon	N/A
Pettigrew, Jill	N/A
Pflug, Maria	N/A
Phares, David	N/A
Pharris , Charles	3.2; 3.6; 8.3
Phillips, George	2.4; 2.13
Phillips, Patrick	N/A
Phillips, Thomas	2.4; 2.13
Phillips-Calapai, Jean	2.4; 2.13
Picchetti, Gloria	2.4; 2.13
Picciani, Laureen	N/A
Picker, Seth	2.4; 2.13
Pickett-Harner, Molly	N/A
Pieniazek, Annette	2.4; 2.13
Pier, Philip	3.2; 3.6; 8.3
Pierce, Arden	2.4; 2.13
Pierson, James	2.4; 2.13
Pike, Ryan	12.1
Pillar, Ina	N/A
Pineda, Faye	N/A
Pinkham, Debra	2.4
Pinto, Juliann	2.4
Piske, Barbara	2.4
Pistorius, Stephen	3.6
Pitagora, Robert	2.11; 2.13
Plastas, Harold	N/A
Platt, David	2.4; 2.13
Pocius, F. Jay	N/A
Podorson, Myra	N/A
Pogel, G.	2.4; 2.13
Poland, Dianne	N/A
Polefka, Thomas	2.4; 2.13
Polk, Nora	2.4; 2.13
Pollack, Michael	2.4; 2.13
Pollock, Robert	N/A
Pons, Scott	2.4; 2.13
Poole, Richard	N/A
Pooler, Carole	2.4; 2.13
Pope, Priscilla	N/A

TABLE Q-3 (Cont.)

Pope, Susan	2.4; 2.13
Porter, Betsey	2.4; 2.13
Porter, Brian	2.4; 2.13
Porter, K.T.	2.4; 2.13
Porter, Sharon	N/A
Portney, Thomas	2.4; 2.13
Portnoy, Dennis	2.1; 2.2; 2.8; 2.14; 13.1
Potochnik, Andre	2.4; 2.11; 2.13; 2.16
Potter, Dave	2.4
Pottinger, Hans	N/A
Potucek , Kimberly	2.4; 2.13
Povill, Jon	2.4
Powell, Lance	2.4; 2.13
Powers, Marlene	N/A
Powers, Sheila	2.4; 2.13
Prezant, Jennifer	N/A
Price, Charles	3.2; 3.6
Price, Norman	N/A
Prochowski, Richard	N/A
Proffitt, Terry and Karen	2.4; 2.13
Proteau, Mary	2.4; 2.13
Provance, D.	2.4
Purcell, Douglas	2.4; 2.13
Purington II, Ken	N/A
Pynn, Doug	N/A
Quammen, Parker	2.4; 2.13
Querner, Kathleen	2.4
R, Lynn	N/A
Raftery, Rita	N/A
Rahn, Gerald	N/A
Raitt, Jacob	N/A
Ralston, Aron	2.4; 2.13
Ramirez, Carina	N/A
Ramirez, Hank	2.4; 2.13
Ramo, Carol	2.4; 2.13
Ramos, Joann	2.4; 2.13
Randall, Dorene	N/A
Rangel, Louise	2.4; 2.13
Ranz, Lauren	2.4; 2.13
Raper, Connie	2.4; 2.13
Rappaport, Alexandra	2.4; 2.13
Rasmussen, Nancy	2.4; 2.13
Ratcliff, Steve	3.2; 3.6; 8.3
Ratcliff, Philip	2.4; 2.13
Ray, Jack	2.4; 2.13
Ray, Linda	2.4; 2.13
Ray, Mike	2.4; 2.13
Raychaudhuri, Sumana	2.4; 2.13
Re, Sa	2.4
Reames, Robin	2.4

TABLE Q-3 (Cont.)

Redstone, Ray	N/A
Redstrom, John	N/A
Reed, Dirk	N/A
Reed, Jennifer	12.8
Reeder, Ben	2.4; 2.11; 2.13
Reeder, William	N/A
Rees, Michael	2.4; 2.13
Reichel, Tom	N/A
Reid, Nancy	2.4; 2.13; 12.2
Reid, W.S.	3.2; 3.6; 8.3
Reilly, Holly	2.4
Reimer, Dana	12.2
Reinking, Tom	3.2; 3.6; 8.3
Reischl, Terri	N/A
Reisman, Emil	N/A
Reiter, Jane	2.4
Reiter, Steve (Old Pueblo Chapter of Trout Unlimited)	2.5; 2.17; 3.2; 3.3; 3.4; 3.6; 8.3; 12.2
Renard, Robert	3.2; 3.6
Rennacker, Ann	2.4
Renton, Kristen	2.4; 2.13
Rever, John	3.6
Revilla, Oscar	2.4; 2.13
Rexford, Bridgett	N/A
Reynolds, Ronda	2.4; 2.13
Rhodes, Janet	2.4; 2.13
Rhodes, Robert	2.4
Rice, Marybeth	2.4; 2.13
Rich, Chris	3.6
Richardson, Gail	2.4; 2.13
Richardson, James	3.6
Richardson, Matt	3.2; 3.6; 8.3; 12.2
Richardson, Virginia	N/A
Richey, Charles	2.4; 2.13
Ricketts, Carolyn	2.4; 2.13
Riddle, Carolyn	N/A
Ridenour, Rod	2.4; 2.13
Rieck, Michael	N/A
Riffle, Lew (Santa Barbara Flyfishers)	2.4
Riger, Richard	N/A
Riggs, Richard	2.4; 2.13
Rigney, J.	2.4; 2.13
Rimbeaux, B.	2.4
Ringgaard, Line	2.4; 2.13
Riopelle, Robert	2.4; 2.13
Ripp, Rudolph	2.4; 2.13
Risley, Paul	N/A
Rist, Wally (Grand Canyon Private Boaters Associations)	2.4
Rittenhouse, Nancy	N/A
Rivera, Sergio	2.4; 2.13

TABLE Q-3 (Cont.)

Roache, Jim	3.2; 3.6
Roberson, Gracie	2.4; 2.13
Roberts, Duane	N/A
Roberts, Keith	3.2; 3.6; 8.3
Roberts, Sally	2.4; 2.13
Roberts-Ibarra, Suni	N/A
Roberts-Moneir, Nancy	2.4; 2.13
Roberts-Shepherd, Ruth	2.4; 2.13
Robinson, Aaron	2.4; 2.13
Robinson, Craig	N/A
Robinson, Dameta	2.4; 2.13
Robinson, Don	2.4; 2.13; 12.3
Robinson, Ellen R.	N/A
Robinson, Joyce	2.4
Robinson, Laura	2.4
Robinson, Richard	N/A
Robinson, Richard	2.4; 2.13
Rocha, Candace	2.4; 2.13
Roden, Karen	N/A
Roebuck, Marge	N/A
Roegner, Debby	2.4; 2.13
Roenneburg, Drew	2.4; 2.13
Rogers, Lilith	N/A
Rohmer, John	3.2; 3.6; 8.3
Role, Abraham	2.4
Rolf, Carol	2.4; 2.13
Rollo, Pat	2.4; 2.13
Romain, Bella	2.4; 2.13
Romano, David	3.2; 3.6; 8.3
Romanowski, Scott	2.4; 2.13
Romero, Monika	2.4; 2.13
Romesburg, Denise	2.4; 2.13
Romig, Mark	2.4; 2.13
Ronan, Thomas	2.4
Ronneburg, Pat	3.2; 3.6; 8.3
Rood, Edson	3.2; 3.6; 8.3
Rosen, Paul	N/A
Rosenblatt, Jon	N/A
Rosenblood, Jamie	2.4
Rosenblum, Stephen	2.4
Rosenfeld, Ryan	3.2; 3.6; 8.3
Rosenstadt, William	N/A
Roske, Adam	2.4; 2.13
Ross, B. Elliot	2.4; 2.13
Ross, Jean	2.4; 2.13
Rosser, Ellen	2.4; 2.13
Rotermund, Kristy	2.4; 2.13
Roth, Lu	2.4; 2.13
Rothschild, Louis	2.4
Rothschild, Quinn	2.5

TABLE Q-3 (Cont.)

Rothschild, Teal	N/A
Rowe, Spencer	2.1; 2.2; 2.8; 2.14; 13.1
Rowe, William	N/A
Rowell, Patricia	2.4
Rowitz, Roger	2.4; 2.13
Royer, Allen	2.4; 2.13
Rubenstein, Harvey	2.4; 2.13
Rubino, Karen	N/A
Rubino, Vincent	2.4; 2.13
Ruhl, John	2.4; 2.13
Ruiz, Mabel	N/A
Ruiz, O.	2.4; 2.13
Rutkowski, Robert	2.1; 2.2; 2.4; 2.8; 2.13; 2.14; 13.1
Ryaby, James	3.2; 3.6; 8.3
Ryan, George	2.4; 2.13
Ryan, Jack	2.5
Ryan, Joanne	2.4; 2.13
Ryan, Patricia	2.4
Ryerson, William	2.4; 2.13
Sacherer, Janice	2.4; 2.13
Sadowskas, Bruce	2.4; 2.13
Sailer, Randy	2.4
Salazar, Gladys	2.4; 2.13
Salomone, Michael	N/A
Samelson, Audrey	2.4; 2.13
Samoylo, Charles	N/A
Samp, Cecelia	2.4
Sanchez, Ralph	2.4; 2.13
Sanders , Raymond	3.2; 3.6; 8.3
Sanders, David	2.4
Sangster, Carol	2.4; 2.13
Santi, Giri	2.4; 2.13
Sargent, Jackie (Platte River Power Authority)	2.1; 2.3; 2.6; 2.9; 2.10; 2.13; 2.19; 8.9; 8.10
Sarracino, Brendon	3.2; 3.6; 8.3
Sarraille, Marijeannee	2.4; 2.13
Sass, Sherry	2.4; 2.13
Sauerman , Jacqueline	2.4; 2.13
Sawall, Erwin F.	2.8
Sawyer, Mary	2.4; 2.13
Saxon, Diana	2.4; 2.13
Sayler, Becky	2.4; 2.13
Scar, Dick	N/A
Scarpace, Leonard	3.2; 3.6; 8.3
Scarpelli, Kenneth	2.4; 2.13
Scarry, Patrick	2.4; 2.13
Scavezze, Barb	2.4; 2.8; 2.13
Schade, Corey	2.4; 2.13
Schafer, Maggie	N/A
Schafer, Peter	2.4; 2.13
Schaming, Carol	2.4; 2.13

TABLE Q-3 (Cont.)

Scharin, Lisa	N/A
Scherer, W.	2.4; 2.13
Schetzer, Kathryn	2.4; 2.13
Schindele, Paulette	2.4; 2.13
Schindler, Maury	2.4; 2.13
Schlein, Elizabeth	N/A
Schlesinger, Sybil	2.4; 2.13
Schmid, Genevieve	2.5; 2.17; 3.2; 3.3; 3.4; 3.6; 8.3; 12.2
Schmidt, Ted	N/A
Schmidt, Wayne	2.4
Schmitt, Eileen	N/A
Schmitt, Jeff	2.5; 2.17; 3.2; 3.3; 3.4; 3.6; 8.3; 12.2
Schmittauer, John	N/A
Schneebeli, Christiane	N/A
Schneider , Edward	2.4; 2.13
Schneider, L.	2.4; 2.13
Schneller, Douglas	2.4; 2.13
Schoech, D.	2.4; 2.13
Scholl, Barbara	N/A
Scholl, Susan	N/A
Schreier, Bryna	N/A
Schultz, Peter	2.4
Schultz, William	2.4; 2.13
Schupp, Norma	2.4; 2.13
Schwartz, Angela	2.4; 2.13
Schwartz, Deirdre	2.4
Schwartz, Robert	2.4; 2.13
Schwartzberg, Lora	2.4
Scilluffo, Joe	2.4; 2.13
Scopes, Leslie	11.5
Scott, Brian	2.4; 2.13
Scott, Carol	N/A
Scott, Kim	2.4; 2.13
Scott, Mark	N/A
Scott, Raeann	2.4; 2.13
Scranton, Chris	2.4; 2.13
Seals, Suzanne	2.4; 2.13
Sealy, Berenice	2.4; 2.13
Searles, Dave	2.4; 2.13
Season, Ron	2.4; 2.13
Sebastian, Scott	N/A
Sedlock, Evan	3.2; 3.6; 8.3
Sees, Heather	3.2; 3.6; 8.3
Seidner, Dan	12.4
Selbin, Susan	2.4; 2.13
Selig, Stephanie	12.3
Sell, David	2.1; 2.2; 2.8; 2.14; 13.1
Seltzer, Elizabeth	N/A
Seltzer, Rob	2.4; 2.13
Sennett, Frank	N/A

TABLE Q-3 (Cont.)

Sensing, Wanda	2.4; 2.13
Serafino , Stephen	N/A
Sergio, Janette	2.4; 2.13
Severson, Dona	2.4
Sewald, Michelle	2.4; 2.13
Seymour, Linda	2.4; 2.13
Shaffer, Susan	2.4; 2.13
Shapiro, Jane	N/A
Sharfman, William	2.4; 2.13
Sharpton, Debra (Southwest Council International Federation of Flyfishers and the Sierra Pacific Flyfishers)	N/A
Shaw, Lori	N/A
Shear, Julie	2.4; 2.13
Sheets-Johnstone, Maxine	N/A
Sheetz , Jamie	3.2; 3.6; 8.3
Sheetz, Jennifer	2.4
Sheffer, Jeanne	2.4; 2.13
Shelley, Martha	2.4; 2.13
Sheridan, Michelle	2.4; 2.13
Sherman, David	2.4; 2.13
Sherman, Marcia	N/A
Sherman, Rick	2.4; 2.13
Sherwood, Kate	2.4
Shields, Michele	2.4; 2.13
Shiffrin, Joyce	N/A
Shirley, Cameron	3.2; 3.6; 8.3
Shitama, Celeste	2.4; 2.13
Shogren, Martha	N/A
Short, John	2.4
Shouse, Corbin	2.4; 2.13
Shultz, Betty Jane	N/A
Shushan, Cheryl	N/A
Sicklesteel, Cory	8.3
Sidwell, Sarah	2.8
Siegfried , Daniel	3.2; 3.6; 8.3
Siegwald, Joan	2.4; 2.13
Sifuentes, D.G.	2.4; 2.13
Sikand , Vikram	2.4; 2.13
Silver, Ron	2.4; 2.13
Silver, Victoria	N/A
Simle, Anna	2.4; 2.13
Simmerman, Scott	N/A
Simmons, Adrienne	2.4; 2.13
Simmons, Chuck	2.4
Simons, Anita	2.4; 2.13
Singleton, Jon	2.4; 2.13
Sinnott, Larkin	N/A
Sjoden, Eric	N/A
Skaggs, Brian	2.4

TABLE Q-3 (Cont.)

Skarada, Darcy	2.4; 2.13
Skiendzielewski, Danielle	N/A
Skinner, Russell	N/A
Skipworth, Carl	2.4; 2.13
Skirbunt-Kozabo, William	2.4; 2.13
Skow, Loren	N/A
Skrzypczak, Lida	N/A
Skuce, David	3.2; 3.6; 8.3
Skup, Debra	2.4; 2.13
Slater, Dan	3.2; 3.6
Slaughter, Angela (Colorado River Commission of Nevada)	4.1.3; 5.2; 6.4.14; 6.5.1; 6.7; 8.12; 13.3; 13.4
Sloat, Dale	2.4; 2.13
Sloat, Jan	2.4; 2.13
Slote, Karen	2.4; 2.13
Sluis , Janet	3.2; 3.6; 8.3
Smarr, Janet	2.4; 2.13
Smart, David	3.2; 3.6; 8.3
Smereck, Amy	2.4
Smetana, Carol	2.4; 2.13
Smith , Bryan	3.2; 3.6; 8.3
Smith, April	2.4; 2.13
Smith, Bradley	2.4; 2.13
Smith, Dea	N/A
Smith, Donald	3.2; 3.6; 8.3
Smith, Fendrick	2.4; 2.13
Smith, G. Austin	2.4; 2.13
Smith, Jean	2.4; 2.13
Smith, Judith	2.4
Smith, Latimer	2.12
Smith, Lib	N/A
Smith, Mack	2.4; 2.13
Smith, Mary Jordan	N/A
Smith, Mollie	N/A
Smith, Moreland	2.4; 2.13
Smith, Neill	N/A
Smith, Phyllis	N/A
Smith, Roger	2.4; 2.13
Smith, Sean	8.3
Smock, Amanda	2.4
Smoot, Leslie	2.4; 2.13
Smudin, Carole	N/A
Sneath, Barbara	2.4; 2.13
Snider, Jay	2.4; 2.13
Snow, N/A	N/A
Snyder, Cindy	2.4; 2.13
Snyder, Joanne	N/A
Snyder, Paul, Jr	3.2; 3.6; 8.3
Snyder, Robert	2.4; 2.13
Sobanski, Sandra	2.4; 2.13

TABLE Q-3 (Cont.)

Sodos, Michael	2.4; 2.13
Solomon, David	N/A
Solomon, David	N/A
Solomon, Phillip (Deseret Power Electric Cooperative)	2.6; 2.7; 2.10; 2.12; 2.21; 8.1
Solum, Mary	2.4; 2.13
Somers, Jeff	2.4; 2.13
Sorensen, Colleen	2.4
Sorokwasz, David	3.2; 3.6
Sorum, Robert	2.4; 2.13
Souza, P.	2.8
Spangle, Steven (U.S. Fish and Wildlife Service)	2.2; 2.9; 3.2; 3.6; 3.7; 3.8; 8.12; 8.13; 11.2
Sparger, Janet	2.8
Sparks, Alan	3.6
Sparrow, Deb	2.4; 2.13
Spaulding, D.	N/A
Speakman, David	N/A
Species, Scott	2.4; 2.13
Speer, Mark	3.2; 3.6; 8.3
Spence, Liter	2.4
Spengler, Brett	2.4; 2.13
Spiegel, Karen	2.4; 2.13
Spilker, Mike	3.2; 3.6; 8.3
Spillane, Rita	2.4
Spilsbury, Delaine (Bristlecone Alliance)	N/A
Spinelli, Nancy	2.4
Spirakis, Jenn	N/A
Spokony, Irving	2.4
Spragins, John	2.4; 2.13
St. Angelo, Richard	2.4
Stadnik, George	2.4; 2.13
Stambaugh, Joseph	12.2
Stan, Talila	N/A
Standley, Ron	N/A
Stanley, Edwin R	N/A
Stanley, Norm	2.4
Staples, Laura	N/A
Stark, Rodney	2.4; 2.13
Stauffer, Ron	2.4
Staveley, Gaylord (Canyoneers, Inc.)	5.2; 12.4
Staveley, Laura (Canyon Explorations Expeditions)	9.1; 9.2; 12.1; 12.4
Steele, Jon	3.2; 3.6; 8.3
Steele, William	3.6
Steenstra, Philip	12.4
Stefanic, Karen	N/A
Stein, Herbert	2.4; 2.13
Steinberg, Chip	3.2; 3.6; 8.3
Steinhart, Carol	2.4; 2.13
Stephens, Robert	2.4; 2.13
Steppan, Linda	2.4; 2.13
Sterling, Tyson	N/A

TABLE Q-3 (Cont.)

Sternberg, Karin	2.4; 2.13
Stevens, Carol	2.4
Stevens, Gavi	N/A
Stevens, Lawrence (Grand Canyon Wildlands Council)	2.2; 2.5; 3.1; 7.4; 11.2
Stevens, Nike	N/A
Stevenson, Joey	N/A
Stewart, Mark	2.4; 2.13
Stewart, Sarah	2.4; 2.13
Stickel, Ann	N/A
Stieglitz, Joseph	2.4; 2.13
Stiles, Sarah	2.4; 2.13
Stillwell, Robert	3.2; 3.6; 8.3
Stoker, Cayley	N/A
Stoltenberg, John and Martha	N/A
Stone, Harry	2.4; 2.13
Stoner, Cynthia	2.4; 2.13
Stoner, Jon	2.12; 2.22
Stong, Stuart	N/A
Story, Don	2.4; 2.13
Strange, Marisa	N/A
Stratton, Jim	2.4; 2.13
Strauss, John	2.4
Streeter, Matthew	3.2; 3.6; 8.3
Strogen, Jim	2.9
Strong, Timothy	2.4
Struthers, Sue	N/A
Stuart, Michael	2.4; 2.13
Stucker, Melinda	2.4
Stump, David	2.4; 2.13
Sturm, Madeline	2.4; 2.13
Suarez, Joe	2.4; 2.13
Suda, Maryska	N/A
Sullivan, Gail	2.4; 2.13
Sullivan, Teresa	N/A
Summerville, Deborah	2.4; 2.13
Suniga, Michael	3.2; 3.6; 8.3
Sutkowski, John	2.4; 2.13
Sutton, Susan	2.4
Swan, Curtis	2.4; 2.13
Swanepoel, Karen	2.4; 2.13
Swanson, Cynthia	2.4; 2.13
Sweeney, John	N/A
Sweet, Harold	2.4
Sweet, Justin	2.4; 2.13
Sweetling, William	2.4; 2.13
Swift , Josh	3.2; 3.6; 8.3
Syapin, Peter	N/A
Sykes, Tom	N/A
Szof, Cheryl	2.4; 2.13
Szymanowski, Paul	2.4; 2.13

TABLE Q-3 (Cont.)

Tacker, Barbara	2.4
Tajdari, Amy	2.4; 2.13
Talbert, Aaron	3.2; 3.6; 8.3
Talbot, J	2.4; 2.13
Talbot, Thomas	2.4; 2.13
Talleagle, David	N/A
Tanner, Mary	2.4
Tao, Carol	2.4; 2.13
Tarallo, Mary	2.4
Taube, N/A	N/A
Taylor , Rocky	3.2; 3.6; 8.3
Taylor, Donald	N/A
Teed, Halcyon	2.4
Tendler, Marlene	2.4; 2.13
Terry, Thomas	2.4; 2.13
Tetarenko, Pamela	2.4; 2.13
Thelander, Donna	2.4; 2.13
Theriault, Laurence	N/A
Thiele, Jim	2.4; 2.13
Thomas , Ron	3.2; 3.6; 8.3
Thomas, Amy (American Public Power Association)	2.4; 2.10
Thomas, George	N/A
Thomas, Ron	N/A
Thomason, Michael	2.1; 2.2; 2.8; 2.14; 13.1
Thompson, Don	N/A
Thompson, Thurston	2.4; 2.13
Thomsen, Gary	2.4; 2.13
Thorn, Debbie	2.4; 2.13
Thornbloom, Gary	2.4
Thrailkill, James	2.4
Tibbets, Linda	N/A
Tibbitts, Connie	N/A
Tibbitts, Connie	2.4; 2.13
Tigerlily, Eliot	N/A
Tipton, James	3.6
Tobin, John (Pasadena Casting Club)	2.16; 3.6
Toler , Jean	N/A
Tomaselli, Susan	N/A
Tomlin, Curtis	2.4; 2.13
Tomlinson, Lynne	2.4
Tonks, Mary	2.4; 2.13
Torchenot, Ferold	N/A
Torgerson, Eric	2.4
Torres, Joseph	2.4; 2.13
Townsend, Darlene (Phoenix Institute for Human Development)	2.4; 2.13
Trafecanty, Chris	3.2; 3.6; 8.3
Travis, Donna Mae	N/A
Traweek, James	N/A
Trebbe, Dixie	2.4

TABLE Q-3 (Cont.)

Trevillian , Linda	N/A
Trice, Tina	2.4; 2.13
Trinkle, Heidi	2.4; 2.13
Trout, Larry	2.4; 2.13
Trujillo, Tanya (Colorado River Board of California)	2.2; 2.4; 3.5; 3.8; 5.1; 5.2; 6.1.3; 6.7; 8.12
Tuch, Christopher	2.4; 2.13
Tudor, Geoffrey	2.4
Tuke, Carla	2.1; 2.2; 2.8; 2.14; 13.1
Turley, Steven	2.1; 2.2; 2.8; 2.14; 13.1
Turner , James	3.2; 3.6; 8.3
Turner, Dawn	2.4; 2.13
Turner, Doris	2.4; 2.13
Turner, Julie	2.4; 2.13
Turner, Kathleen	2.4; 2.13
Turner, Phyllis	2.4; 2.13
Turner, Tamara	2.4
Tuttle, Jeffrey	2.4
Twickler, Carrie	N/A
Tyrrell, Patrick (Wyoming State Engineer's Office)	2.5; 2.19; 8.7, 8.12
Tyson, Kathleen	N/A
Upp, Heidi	N/A
Uribe, Esmeralda	2.4; 2.13
Utley, Chad	3.2; 3.6; 8.3
Utter, Mark	3.2; 3.6; 8.3
Utzig, Albert	2.4; 2.13
Uyetanaka, Steven	N/A
Vacek, Radko	2.4
Vachula, William	2.4; 2.13
Vail, Mark	2.4; 2.13
Valdez, Richard	N/A
Valentino, David	2.4; 2.13
Van Buren, Kenneth	N/A
Van Kampen, Art	N/A
Van Kolken, Robert	2.4; 2.13
Van Leekwijck, Natalie	2.4; 2.13
Van Pelt, Jason	2.4
Van Tassell, Bruce	N/A
Van Velson, Nathan	2.4; 2.13
van Wijk, Melissa	2.4; 2.13
Vanderhill, Margo	N/A
VanderLaan, Harold	2.4; 2.13
VanWinkle, Jean Marie	2.4; 2.13
Varanitsa, Oleg	2.4; 2.13
Varnon, Dee	2.4; 2.13
Vatter, Sherry	2.4; 2.13
Vecchiotti, Dorothea	2.4; 2.13
Veltkamp, Robert	2.4; 2.13
Vermeulen, Mary	N/A
Vermeulen, Mary	N/A
Vernon, Gerald	2.4; 2.13

TABLE Q-3 (Cont.)

Vernon, Margaret	2.4; 2.13
Veynar, Vance	3.2; 3.6; 8.3
Viacrucis, John	2.4; 2.13
Vick, Margaret (Havasupai Tribe)	3.2; 10.7; 10.8
Vilkin, Jeffrey	3.2; 3.6
Villalobos, Lydia	N/A
Villanova , Carolyn	N/A
Vincent, Joseph	N/A
Voelker, Paul	3.6
Vogel, Steven	2.4; 2.13
Vogelsong, Patrick	2.4; 2.13
von Eberstein, Lesli	2.4; 2.13
Von Tobel, Jefffrey	3.2; 3.6
Von tobel, William	N/A
Vorachek, Mary	2.4; 2.13
Vrymoed, John	2.1; 2.11
Waddell, Christine	N/A
Wagner, Robert	2.4
Wagner, Vickie	2.4
Wagoner, Douglas	2.4; 2.13
Waite, Paul	3.2; 3.6; 8.3
Walchak, Shelley	2.4; 2.13
Walker, Jim (Zane Grey Trout Unlimited)	2.5; 3.2; 3.3; 3.4; 3.6; 8.3; 12.2
Wallace, John (Grand Canyon State Electric Cooperative Association, Inc.)	2.6; 2.11
Wallis, Tracy	2.4; 2.13
Walls, Mary	2.4
Walsh, Gary	N/A
Walsh, Justin	2.4
Walsh, Tom	N/A
Walters, Robyn	2.4; 2.13
Walters, Sandra	2.4
Walton, John	2.4; 2.13
Walz, Kenneth	N/A
Ward, Everett	2.1; 2.2; 2.8; 2.14; 13.1
Ward, Ken	2.4; 2.13
Ward, Marvin	2.4; 2.13
Warner, Charles	N/A
Warwick, Maureen	2.4
Washburn, Thomas	2.4
Washington, Martin	N/A
Waskey, Susan	2.4; 2.13
Wasser, Nancy	2.4; 2.13
Watanabe, Wayne	3.2; 3.6; 8.3
Watland, Bob	N/A
Watt, Celeste	2.4
Watters, Whitney	2.4; 2.13
Watts II, Howard	3.2; 3.6; 8.3
Weales, Ron	2.1; 2.2; 2.8
Weaver, Larry	3.2; 3.6; 8.3

TABLE Q-3 (Cont.)

Weber, Carol	2.4; 2.13
Wechter, Michael	N/A
Weeks, Ken	2.4
Weihrauch, Gary	3.2; 3.6; 8.3
Weinberger, Deborah	N/A
Weiner, Jeffrey	3.2; 3.6; 8.3
Weinstein, Elyette	2.4; 2.13
Weisheit, John (Living Rivers & Colorado Riverkeeper)	2.8; 2.9; 2.14; 2.18; 5.1; 6.1.1; 6.1.4; 6.1.6; 6.1.7; 11.5
Weiss, Leslie	2.4
Weiss, Stuart	2.4
Weisz, Russell	2.4; 2.13
Wellin, Paul	N/A
Wells, J.	2.4; 2.13
Wells, Michael	2.4
Welty, Walter	3.2; 3.6; 8.3
Wemer, Kim	2.4; 2.13
Wen, William	3.2; 3.6
Wendt, George (O.A.R.S.)	2.12
Wenzel, Quentin and Jacquelyn	N/A
Werner, Katherine	2.4; 2.13
Westfall, Brian	N/A
Westfall, Sara	N/A
Wheadon, Rick	N/A
Wheeler, Dorothy	N/A
Wheeless, Erin	2.4; 2.13
Whitaker, Howard	2.4; 2.13
White, Bryson	N/A
White, Diane	N/A
White, Eugene	N/A
White, Howard	2.4; 2.13
White, Michael	N/A
White, Scott	2.4; 2.13
Whitehouse, Charlie	3.2; 3.6; 8.3
Whitehouse, Katy	2.4; 2.13
Whiteside, Catherine	2.4; 2.13
Whitlock, Glen	12.4
Whitman, Rick	2.4; 2.13
Whitmire, Donna	N/A
Whitmore, Thomas	N/A
Whitney, Ellen	2.4; 2.13
Whitney, James	2.4; 2.13
Whittick, Vard	2.4; 2.13
Whitton, Erika	2.4; 2.13
Whorley, R	N/A
Wichman, Michael	2.4; 2.13
Wick, Jodi	2.4; 2.13
Wicks, Alicia	N/A
Widen, Alyson	2.4
Wieduwilt, Trudi	2.4; 2.13
Wieland, Charles	2.4; 2.13

TABLE Q-3 (Cont.)

Wiener, William	2.4
Wightman, Kevin	2.4; 2.13
Wilding, Michael	N/A
Wilkerson, Colleen	2.4
Wilkins, Marcelle	N/A
Wilkins, Rose	2.4; 2.13
Williams, Catherine	2.4; 2.13
Williams, Judd	N/A
Williams, Lee	N/A
Williams, Mara	N/A
Williams, Marilyn	2.4; 2.13
Williams, Mitch	2.4
Williams, Pat	N/A
Williams, Patti	2.4; 2.13
Williams, Patty	2.4; 2.13
Williams, William	2.4; 2.13
Williamson, Gay	N/A
Williamson, Kiyoshi	N/A
Willson, Clyde	2.4; 2.13
Wilp, Ludger	N/A
Wilson, Angela	2.4
Wilson, David	2.4; 2.13
Wilson, Ken	3.2; 3.6; 8.3
Wilson, Kim	2.4; 2.13
Wilson, M Wayne	2.4; 2.13
Wilson, Michael	3.2; 3.6; 8.3
Wilson, Sharon	2.4; 2.13
Wine, Jordann	2.4; 2.13
Winstead, Annie	2.4
Winter, Lindsay	2.12
Wirth, Mark	2.4
Wisboro, Judy	N/A
Wise, Barbara	2.4; 2.13
Witchner, Beverly	N/A
Wittorp, Lauren	3.2; 3.6; 8.3
Wittorp, Terry	3.2; 3.6; 8.3
Wockner, Gary (Save the Colorado)	1.6; 2.8; 2.14; 5.2
Woelk, Barbara	2.4; 2.13
Wolenter, Richard	2.4; 2.13; 12.3
Wolf, Karen	N/A
Wolf, Martin	3.2; 3.6; 8.3
Wolf, Wesley	2.1; 2.2; 2.8; 2.14; 13.1
Wolongevicz, Patricia	2.4
Wong, Steve	3.6
Wood, Jon	N/A
Wood, Peter	2.4; 2.13
Wood, Sara	2.4; 2.13
Woodall, Greg	2.4; 2.8
Woodward, Ellis, Jr	2.4; 2.13

TABLE Q-3 (Cont.)

Woolridge, Nancy	2.4; 2.11; 2.13
Worley, Robert	2.4
Worth, Daniel	3.6
Worthy, Crista	2.8; 2.14; 13.1
Wostenberg, Darren	2.4
Wright III, Trigg	2.4; 2.13
Wright, Steven	2.4; 2.13
Wurtz, Betty	N/A
Wyatt, Cathy	2.4; 2.13
Wyatt, Jennifer	N/A
Wykstra, Kyle	2.13; 4.1.2;7.3.1; 11.3
Wylie, Mary	2.4; 2.13
Wyse, Margo	N/A
Xavier, Marjorie	2.4
Yarger, Andrea	2.4; 2.13
Yasgur, Eleanor	2.4
Yost, Gaylord	2.4; 2.13
Young, Dennis	N/A
Young, Jo Ellen	2.4
Yount, Madeline	N/A
Yount, Robin	3.2; 3.6; 8.3
Yun, Allen	2.4; 2.13
Zagona, Helen	3.6
Zanger, Manfred	N/A
Zastrow, Lila and Hendrickson, Dave	2.4; 2.13
Zei, Wayne	3.2; 3.6; 8.3
Zerr, Laura	2.4; 2.13
Zerzan, Paula	2.4; 2.13
Zeutenhorst, Dennis	2.4; 2.13
Zick, Edward	N/A
Zieber, Thomas	2.4; 2.13
Ziegler, Russell	N/A
Ziegler, russell	N/A
Zielinski, Virginia	2.4; 2.13
Zirasri, Ran	2.4; 2.13
Zornesky, Jerome	2.4; 2.13
Zoupas, Robbin	N/A
Zuckerman, Ben	2.1; 2.2; 2.8; 2.14; 13.1

[a] For individuals or organizations that entered comments to the PEPC online database, names and affiliations shown here are as provided in those entries. Occasionally, hard copies of the same comments were mailed to DOI with a different signatory.

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