APPENDIX B

STAFF RESPONSES TO COMMENTS ON THE DRAFT EIS

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STAFF RESPONSES TO COMMENTS
ON THE DRAFT EIS

The U.S. Environmental Protection Agency (EPA) notice of availability of the draft environmental impact statement (EIS) for the Klamath Hydroelectric Project was issued on September 25, 2006. Comments on the draft EIS were due on November 24, 2006, which the Commission later extended to December 1, 2006. The following groups filed comments on the draft EIS.

Commenting Entity	Filing Date
Kalmisopsis Audubon Society	November 15, 2006
Environmental Justice Coalition for Water	November 20, 2006
State of Oregon, Parks and Recreation Department	November 21, 2006
Fishermen's Association of Moss Landing	November 21, 2006
American Fisheries Society, Oregon Chapter	November 22, 2006
City of Morro Bay, California	November 22, 2006
The American Sportfishing Association	November 22, 2006
Upper Klamath Outfitters Association	November 24, 2006
Alameda Creek Alliance	November 24, 2006
Siskiyou County, California	November 27, and December 8, 2006
Santa Cruz Fly Fishermen Club	November 27, 2006
Mid Klamath Watershed Council	November 27, 2006
Winnemem Wintu Tribe	November 27, 2006
Quartz Valley Indian Reservation	November 28, 2006
Humboldt County Board of Supervisors	November 28, 2006
Friends of Del Norte	November 28, 2006
Mattole Salmon Group	November 28, 2006
Resighini Rancheria	November 29, 2006
State of Oregon: Department of Fish and Wildlife, Department of Environmental Quality, Department of Energy, Oregon Parks and Recreation Department, and State Historic Preservation Officer	November 30, 2006
Redwood Region Audubon Society	November 30, 2006
Northcoast Environmental Center	November 30, December 1, and December 8, 2006
City of Yreka, California	November 30, and December 1, 2006
U.S. Department of Agriculture, Forest Service, Pacific SW Region	November 30, 2006
State of California, Department of Fish and Game	November 30, 2006
National Marine Fisheries Service	November 30, 2006
Klamath Tribes	November 30, 2006
California State Water Resources Control Board, Division of Water Rights	November 30, 2006
Humboldt Bay: Harbor, Recreation and Conservation District	November 30, 2006
Rogue Flyfishers	December 1, 2006
Hoopa Valley Tribe	December 1, 2006
Siskiyou County Grange	December 1, 2006
PacifiCorp Energy	December 1, 2006
Karuk Tribe of California, Department of Natural Resources	December 1, 2006
California State Coastal Conservancy	December 1, 2006

Commenting Entity	Filing Date
Conservation Groups[1]	December 1, 2006
Yurok Tribe	December 1, and December 17, 2006
American Whitewater Affiliation	December 1, 2006
California Indian Basketweavers Association	December 1, 2006
Klamath Water Users Association	December 1, 2006
California Energy Commission	December 1, 2006
Klamath Riverkeeper[2]	December 1, 2006
U.S. Department of the Interior, Fish and Wildlife Service	December 1, 2006
California Regional Water Quality Control Board, North Coast	December 1, 2006
Redwood Community Action Agency, Natural Resources Service Division	December 1, 2006
U.S. Environmental Protection Agency, Region 10	December 1, 2006
Institute for Fisheries Resources, Pacific Coast Federation of Fishermen's Association	December 1, 2006
Lost Coast League	December 1, 2006
Ad Hoc Committee	December 1, 2006
Pacific Fishery Management Council	December 1, 2006
Energy and Resource Advocates	December 4, 2006
Mistwood Center for Education	December 8, 2006
North Coast Consumer's Alliance	December 8, 2006
Siskiyou Land Conservancy	December 8, 2006
North Group, Redwood Chapter, Sierra Club	December 12, 2006
Klamath Basin Audubon Society	December 21, 2006

In this appendix, we summarize the comments received; provide responses to those comments; and indicate, where appropriate, how we modified this EIS in response to the comment. Numerous individuals (listed in appendix C) filed written comments on the draft EIS and many individuals (listed in appendix D) also provided oral comments on the draft EIS at public meetings held after issuance of the draft EIS and these comments are also addressed in this appendix. We group the comments by the following topics for convenience:

	Page		Page
General and Procedural (G)	B-3	Threatened and Endangered Species (TE)	B-189
Geology and Soils (GS)	B-32	Recreational Resources (R)	B-196
Water Quantity (WQ)	B-51	Land Use and Aesthetics (L)	B-227
Water Quality (WQL)	B-58	Cultural Resources (C)	B-231
Aquatic Resources (A)	B-98	Socioeconomic Resources (S)	B-239
Terrestrial Resources (T)	B-179	Developmental Analysis (D)	B-249

[1]Conservations Groups include American Rivers, California Trout, Friends of the River, Klamath Forest Alliance, National Center for Conservation Science and Policy, Northcoast Environmental Center, Northern California/Nevada Council of Fly Fishers, Oregon Wild, Salmon River Restoration Council, Sierra Club, Trout Unlimited, and WaterWatch of Oregon.

[2]Klamath Riverkeeper includes the Klamath Siskiyou Wildlands Center, Environmental Information Protection Center, California Coastkeeper Alliance, Russian Riverkeeper, Cook Inletkeeper, Waccamaw Riverkeeper, The Warner Creek Company, Native Forest Council, Humboldt Baykeeper, and Santa Monica Baykeeper.

GENERAL AND PROCEDURAL

G-1 Comment: Humboldt County Board of Supervisors (p. 2) states that the Commission is authorized to license hydroelectric facilities for up to 50 years but the existing project was designed and constructed using a 20 year design, and the youngest facility is now more than 50 years old. Humboldt County Board of Supervisors comments that the Commission should license the project for the minimum term necessary to cover the dam deconstruction period (not to exceed 15 years).

Response: The Commission has authority under the Federal Power Act to issue new licenses for terms ranging from 30 to 50 years and could therefore not issue a new license for a term of 15 years or less. If dam removal were authorized by the Commission, it would be associated with either a license surrender or development decommissioning proceeding, in which case any such dam could be removed during a shorter timeframe than the 30 year minimum license term.

G-2 Comment: National Marine Fisheries Service (NMFS) (p. 2); United States Department of the Interior (Interior) (p. 2); the Hoopa Valley Tribe (pp. 2-8); the Klamath Tribes (pp. 1-3); the Karuk Tribe (p. 1); the Yurok Tribe (pp. 2-4); Rogue Flyfishers (pp. 2 and 3); Klamath Riverkeeper et al. (pp. 1, 2, 8, and 9); Pacific Coast Federation of Fishermen's Associations et al. (pp. 2, 28-32); Josh Strange (p. 3); Redwood Region Audubon Society (pp. 1 and 2); North Group, Redwood Chapter, Sierra Club (pp. 1 and 2); and Conservation Groups (pp. 1 and 2) state that there are a number of deficiencies in the draft analysis, and that significant new information is available relevant to the application such that they recommend the Commission issue a supplemental draft EIS for further public review prior to issuing the final EIS and licensing decision. They state the new information includes (1) the decision of the Administrative Law Judge (ALJ)[3] in the trial-type hearing on disputed issues of material fact with respect to mandatory conditions that NMFS and Interior (on behalf of the U.S. Bureau of Reclamation and U.S. Bureau of Land Management) seek to include in any re-license issued for the operation of the Klamath Hydroelectric Project; (2) California State Coastal Conservancy studies of project reservoir sediments completed during 2006; (3) NMFS's 2006 Final Rule and Temporary Rule for Emergency Action for the West Coast Salmon Fisheries; (4) NMFS's Determination of a Fishery Failure due to a Fishery Resource Disaster; (5) the EPA-issued health advisory concerning blue green algae in project reservoirs; (6) a 2006 analysis of PHABSIM modeling by Li; (7) 2006 memoranda regarding bypassed reach flows by Gard and Robison; and (8) the revised mandatory conditions submitted by the agencies following the ALJ decision. The Hoopa Valley and Klamath tribes state that it is not sufficient for the Commission to evaluate this information in a final EIS because it would deny them the opportunity for meaningful comment.

Oregon Department of Fish and Wildlife (Oregon Fish & Wildlife) (pp. 8-12, 21-23) and Humboldt County (p. 2) also request that the analysis for the EIS include information from the ALJ decision. California Indian Basketweavers Association (p. 3), Winnemem Wintu Tribe (p. 2), Marge Salo (pp. 2 and 3), Environmental Justice Coalition for Water (p. 2), Alameda Creek Alliance (p. 1), Santa Cruz Fly Fishermen (p. 1), Conservation Groups (p. 8), and Northcoast Environmental Center (p. 2) also point out that the draft EIS failed to incorporate the results of the California Coastal Conservancy's study that concludes that dam removal could be done safely and affordably without leading to floods or exposing the river to toxins, and the ALJ decision that concluded that project operations have affected and continue to adversely affect river health, including resident trout and riparian habitat.

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[3]Decision. Dated September 27, 2006. Issued by: Hon. Parlen L. McKenna, Presiding. In the Matter of: Klamath Hydroelectric Project (license applicant PacifiCorp). Docket Number 2006-NMFS-0001. Filed by letter from G. P. Kaitell-Paul, Attorney-Advisor, U.S. Coast Guard, Baltimore, MD, to the Commission dated October 2, 2006.

Response: We recognize that much new information has been developed and filed with the Commission since the issuance of the draft EIS; we consider this information, and incorporate it, as appropriate, in this EIS. However, this information does not necessitate issuance of a supplemental draft EIS.

The final mandatory conditions issued by these agencies reflect their consideration of the ALJ decisions. Although the results of the California Coastal Conservancy study are certainly relevant to this proceeding, as we indicate on page 4-4, lines 34-39, of the draft EIS, we assume in our assessment of dam removal costs that the sediments in project reservoirs are not contaminated and could be released to downstream areas rather than treated as hazardous waste (which could make dam removal exceedingly costly). Thus our dam removal assessments in the draft EIS would not have changed based on the results of this study. We also acknowledge that the Water Board and California EPA issued a public health advisory pertaining to project reservoirs on pages 3-117 and 3-118 of the draft EIS.

In our draft EIS, we also recognize that the anadromous fishery associated with the Klamath is currently depressed and in need of remedial actions; further documentation of this ongoing condition would not have changed our analysis. We reviewed recent critiques of some of PacifiCorp's studies provided by resource agencies and referenced in this comment summary. Such exchange of information is not unexpected and our revised analysis in this EIS reflects our consideration of that new information and analysis. We also expect research and studies to continue for the foreseeable future throughout the Klamath River watershed to help understand and address the multiple causes of anadromous fish declines.

G-3 Comment: Northcoast Environmental Center (p. 2) states that the Staff Alternative is inconsistent with the ALJ decision. All decisions on relicensing thereafter must be made using the facts from that trial, according to Northcoast Environmental Center's interpretation of EPAct. None of the alternatives considered in the draft EIS meet the legal requirements of opening up fish habitat for all Klamath River species and improving water quality to the fullest possible extent.

Response: As we indicate in the previous comment response, the final mandatory conditions issued by these agencies reflect their consideration of the ALJ decisions. This EIS analyzes those mandatory conditions. The Federal Power Act (FPA) requires the Commission to balance the power and developmental purposes for which licenses are issued with measures that enhance or protect environmental quality.

G-4 Comment: Oregon Fish & Wildlife (pp. 8-12) and Interior (p. 2) provided lists of reports and filings, some of which were not available when the draft EIS was being developed, that they believe should have been referenced in our draft EIS to support our analysis. Both agencies ask that our EIS incorporate the information in these documents.

Response: We reviewed the lists of reports and filings provided by the agencies, and although we cite many reports and filings from the authors of the indicated reports in our draft EIS, we did not necessarily cite every report and filing by all of the entities that filed such information with the Commission. Information in the indicated documents in some cases also was available from other documents that we cite, is duplicative of information that we cite, or did not necessarily enhance our analysis of the issues. In some cases, the documents serve as support for the ALJ's decision, and we cite the decision to support certain statements that we make in this EIS, such as the observations by Dunsmoor of a substantial stranding event in the peaking reach following the first peaking cycle of the season, without citing the source memorandum from Dunsmoor. We also note that the entire administrative record from the EPAct proceeding has been filed with the Commission and is part of the administrative record for this proceeding.

G-5 Comment: On page 1-5, lines 7-8, of the draft EIS, we state that PacifiCorp filed responses to the comments, terms, conditions, prescriptions, and recommendations on May 12, 2006. Klamath Water Users Association (KWUA) (p. 2) notes that it also provided reply comments and that its letter should be referenced and considered.

Response: We recognize that KWUA and others have filed comments in response to various letters filed by other entities, and we consider such letters, as appropriate, in our analysis. Our regulations provide the applicant for a new license an opportunity to file reply comments in response to the terms and conditions filed in response to the REA notice within 45 days of the end of the comment period. We indicated the date of PacifiCorp's reply comment letter to document that the letter was filed within the 45 day period. Other parties are free to file comments as they deem appropriate, but we typically do not list all such letters in the NEPA document.

G-6 Comment: Oregon Fish & Wildlife (pp. 13-14) and Klamath Riverkeeper et al. (pp. 7 and 8) state they are concerned the Commission adopted limited and sometimes incorrect information from PacifiCorp studies, and discounted study results from state, federal, tribal, and nongovernmental organization entities that highlighted some factual errors in PacifiCorp's studies.

Response: Pre-filing consultation requirements in the Commission's regulations are designed to identify key issues and the studies needed to address those issues. PacifiCorp consulted with a number of stakeholders when developing its study plans, and we are aware that some of the consulted stakeholders were not satisfied with every final study plan that PacifiCorp developed or the outcome of some of the studies that were implemented. We evaluated PacifiCorp's study results in light of stakeholder concerns. In some instances, we agreed that some of the studies may not have been appropriately implemented or had limited value, and we indicated this in our draft EIS (e.g., some aspects of the geomorphology studies). In other instances, we pointed out that there were sufficient uncertainties because of conflicting opinions regarding the validity of certain studies and that we did not use them to draw substantive conclusions during our analysis (e.g., some studies of the peaking reach). In other instances, we chose not to rely on certain studies at all in reaching our conclusions (i.e., the Miller radio-telemetry study). We also reviewed other reports filed by numerous other entities, and found some to be germane to our analysis. These we cited in our draft EIS. Others may have been interesting but not particularly relevant to our analysis. Not all studies and reports submitted during this proceeding are cited in the draft EIS. This does not mean, however, that we discounted the content of the reports or ignored the opinions of the authors that some of the studies of PacifiCorp may have been flawed.

G-7 Comment: NMFS (p 20) comments the draft EIS did not adequately analyze key aspects of the mandatory conditions and recommendations, leaving out critical data, reports, studies, and analysis filed by the Services, state agencies, and Tribes. The draft EIS provides no meaningful analysis of impacts of the mandatory conditions or recommendations related to protection of aquatic resources, instead summarily dismissing them as too expensive or suggesting they are not needed because the resident trout population is "robust." NMFS does not agree that the Commission's preferred alternative provides adequate environmental mitigation. It comments that the draft EIS provides little or no underlying data, references, or explanation of the analysis procedures used to develop its conclusions, particularly with respect to the flows prescribed in the mandatory conditions.

Response: We present our analysis of the environmental effects of various mandatory conditions and recommendations in section 3 of the EIS, and we maintain that we have provided meaningful analysis of those effects. We cite numerous studies and explain our analytical approach at many locations throughout section 3. As we indicate on page 3-1 of the draft EIS, unless otherwise indicated, the source of our information is the license application. In this case, there is much information relevant to this proceeding in the license application. We use our analysis of the environmental effects in section 3 in combination

with our developmental analysis in section 4 to balance our findings and establish our recommendations in section 5. Consequently, although in section 5 we may reject certain measures as too costly given the expected environmental benefits established in section 3, we do not reiterate all the environmental effects (both adverse and beneficial) in our summary discussions in section 5. See also our response to the previous comment.

G-8 Comment: Klamath Riverkeeper et al. (p. 7) states that the draft EIS violates NEPA by claiming to analyze several alternatives in the alternatives section of the draft EIS while only considering the proposed alternative through most of the rest of the document. They comment that "For instance on pages 2-1 through 2-53, only the staff alternative, the staff alternative with mandatory conditions, and PacifiCorp's proposed action are actually addressed."

Response: We identified the alternatives that we intended to analyze in our NEPA document in section 3 of SD2. These alternatives included PacifiCorp's proposed project, the Staff Alternative, retirement of additional project developments determined to be reasonable, and the No-action Alternative. In the draft EIS, we evaluate a two dam removal alternative, as well as the Staff Alternative with Mandatory Conditions. As we indicated in section 3.2 of SD2, the Staff Alternative consists of our modifications of the proposed project based on our review of recommendations by agencies, NGOs, tribes, interested parties, and measures developed by Commission staff. We clearly define environmental measures provided by all entities, including PacifiCorp and numerous other stakeholders, to address environmental issues and evaluate the expected effects of those measures in the environmental effects sections of each of the resource areas specified in section 3 of the draft EIS.

G-9 Comment: Oregon Fish & Wildlife (p. 14), Klamath Riverkeeper et al. (p. 2), Josh Strange (p. 3), and American Whitewater (pp. 9 and 10) state the draft EIS does not give equal consideration to power and non-power values for the Klamath River and its important natural resources. The Staff Alternative perpetuates many ongoing impacts on fish and wildlife resources, including water quality, low minimum flows, continued daily peaking, high ramping rates, and lack of safe, effective passage.

Response: The numerous environmental measures that we included in the Staff Alternative described in the draft EIS represent an appropriate balancing of power and non-power values which would result in enhancements to water quality, increases in minimum flows at all project-affected reaches upstream of Iron Gate dam and consistent with BiOp conditions downstream of Iron Gate dam, reductions in the daily water level fluctuations associated with peaking operations, reductions in the ramping rates at project-affected reaches, and what we consider to be measures to achieve effective resident and anadromous fish passage. In response to comments on the draft EIS, we re-evaluated some of our recommended environmental measures and now recommend modified measures that would provide further enhancements to the natural resources of the Klamath River Basin.

G-10 Comment: Interior (p. 67), commenting on pages 2-31 to 2-42 of the draft EIS, states that the Bureau of Land Management 4(e) conditions use the word "shall" instead of "should" as written in the draft EIS.

Response: We purposely use "should" and "would" rather than "shall" and "will" in our NEPA licensing documents to describe our recommendations as well as terms and conditions of other entities, including agencies with mandatory conditioning authority, because our document only makes recommendations that advise the Commission regarding its ultimate licensing decision. We reserve the definitive terms "shall" and "will," for the order that would be issued by the Commission pertaining to this proceeding. We cannot prejudge in our NEPA document whether or not a new license for this project would be issued.

G-11 Comment: Oregon Fish & Wildlife (p. 49), Cal Fish & Game (pp. 2 and 3), American Sportfishing Association (pp. 2 and 3), Pacific Fisheries Management Council (pp. 1, 2, and 27), and the Yurok Tribe (p. 13) state that leaving out preliminary mandatory conditions filed by NMFS and Interior does not allow for meaningful comparisons between the alternatives. The mandatory prescriptions for Section 18 and 4(e) are requirements and not discretionary. Similarly, the Hoopa Valley Tribe (pp. 45 and 46) states that the Staff Alternative will likely be inconsistent with the terms and conditions imposed by other state, federal, and tribal entities that have conditioning authority in this proceeding. The purpose and goals of NEPA are undermined if the Commission prepares its EIS in a vacuum, without considering the legal obligations and recommendations of other agencies with conditioning authority. The Staff Alternative is inconsistent with the obligations imposed by the FPA, Clean Water Act, Endangered Species Act, and tribal trust obligations. The EIS would be more useful to the public and the Commission as an informational tool if it recommended an approach that is consistent with the applicable legal standards. The Karuk Tribe (pp. 8 and 9) states the economic viability of the project should use the state and federal agency mandatory terms and conditions as the baseline for analysis. The Karuk Tribe comments that existing economic studies, including the analysis in the draft EIS, suggest that the project will be economically marginal or non-viable under any conceivable relicensing scenario if volitional fish passage is required. Consequently, decommissioning the lower four dams is a viable and logical option.

Response: We are required by NEPA to conduct an independent analysis of potential environmental measures. During our analysis of environmental measures in the draft EIS, no mandatory conditions had yet been finalized, and we therefore considered them to be recommendations that could eventually become mandatory conditions. We note that the conditioning agencies not only referred to the ALJ decision but to the draft EIS in developing the revised mandatory conditions that were filed in late January 2007. Although we still may not agree with the provisions of all of the revised mandatory conditions, we consider the process of integrating analysis from a variety of sources, including the draft EIS, into the development of mandatory conditions is consistent with the intent of EPAct and the FPA. We recognize that with inclusion of the mandatory conditions in a new license, a project may no longer be economically viable, but leave the decision on whether to accept the license to the applicant.

G-12 Comment: Cal Fish & Game (p. 2) states that PacifiCorp's proposed project, as analyzed in the draft EIS, is obsolete because PacifiCorp submitted alternatives to the mandatory conditions filed by Interior and NMFS, pursuant to the EPAct of 2005. Cal Fish & Game interprets these alternative conditions as an amendment to the original license proposal and considers it inefficient for our draft EIS to analyze obsolete alternative actions.

Response: We recognize that PacifiCorp filed alternative environmental measures for many of the fishway prescriptions and 4(e) conditions filed by resource and land management agencies, pursuant to the provisions of EPAct. These represent alternatives to the preliminary mandatory conditions, and in no way modify the environmental measures originally proposed by PacifiCorp. Our analysis of PacifiCorp's proposal in the draft EIS reflects this approach, and we do not consider this to be an obsolete alternative.

G-13 Comment: Cal Fish & Game (p. 2) comments that PacifiCorp's alternative mandatory conditions are interwoven into the Staff Alternative, which is a biased and premature action. It also states that the draft EIS fails to note that Cal Fish & Game, the state of Oregon, and the Hoopa Valley Tribe also filed alternative conditions with the secretaries of Interior and Commerce. Until such time as the modified mandatory conditions are issued, Cal Fish & Game considers it to be inappropriate for us to promote any one alternative set of conditions.

Response: We include PacifiCorp's alternative mandatory conditions, when they are different from its proposed measures, in our description and analysis of environmental measures that have been offered in the interest of completeness. One such example is PacifiCorp's alternative fishway prescription.

Although some portions of the concepts offered by PacifiCorp in its alternative fishway prescription are incorporated into the Staff Alternative in the draft EIS, our approach to anadromous fish restoration is quite different from that specified in the alternative mandatory conditions. The draft EIS disclosed Cal Fish & Game's and Oregon Fish & Wildlife's alternative section 4(e) conditions in table 2-3 (pages 2-36 and 2-37) and discussed the measures in text on page 2-44. However, because the alternative mandatory conditions filed by both resource agencies were identical to their recommendations filed pursuant to section 10(j) of the FPA, we did not distinguish them as agency alternative mandatory conditions elsewhere in the document. We also recognized on page 2-13 of the draft EIS that the Hoopa Valley Tribe filed alternative mandatory conditions that pertained to flows in the Copco No. 2 bypassed reach. This alternative condition was subsequently withdrawn.

G-14 Comment: Siskiyou County (p. 2) generally concurs with the Staff Alternative as set forth in the draft EIS and agrees that substantial progress can be made in anadromous fish restoration without recourse to draconian measures such as dam removal or elimination of peak power production. In addition, the city of Yreka (p. 1), Siskiyou County Grange, and 42 individuals (see appendix C) state that they generally support relicensing of the project.

Response: We appreciate the comments of these entities.

G-15 Comment: Julie Kay Smithson (pp. 2 and 3) objects to our use of the term "developments" when describing various components of the project in the draft EIS. She questions whether not calling them dams results in them not being dams and comments that if we use language that laypeople may not understand, it is difficult for such people to intelligently comment on the draft EIS.

Response: Our terminology in our draft EIS is consistent with that used in other Commission documents and reflects the fact that a project is sometimes made up of more than one development. In most, but not all cases, those developments include a dam, but they also often include many other structures such as a powerhouse, canals, and other water conveyance structures. Our description of each development in the draft EIS should make this clear to the reader, including laypersons. We are confident that our use of the term "development" in the EIS does not impede the ability of laypeople to comment on or understand the document.

G-16 Comment: The Yurok Tribe (p. 10) states that the Commission erred in its description of the No-action Alternative. PacifiCorp has proposed a "trap and haul" alternative as an alternative to the mandatory section 18 fishway prescriptions. This alternative is properly considered the No-action Alternative, according to the tribe. Pacific Fisheries Management Council (p. 2) strongly disagrees with our selection of today's impaired conditions as the baseline for our analysis. California Energy Commission (p. 2) states that the appropriate baseline for making economic comparisons among future conditions is the relicensed project with the mitigation measures required by the agencies and the Commission. Project alternatives that can also meet legal requirements for protecting Klamath Basin resources should be compared to this baseline. Existing conditions, or the No-action Alternative in the draft EIS, are an inappropriate baseline because current operations do not meet legal standards and cannot continue. Josh Strange (p. 5) also disagrees that current conditions are an appropriate analytical baseline, stating that this position is contrary to basic logic and a perversion of the NEPA requirement to equate a no project "no-action" baseline alternative with a "with project status quo alternative." Joyce King (p. 1) was not able to find a description of baseline conditions (e.g., historic ranges of species at risk) in the draft EIS that would be necessary to evaluate cumulative effects, or a statement of intentions to either maintain the current level of impacts, or reduce cumulative impacts to pre-dam, pre-industrial, or pre-agricultural conditions.

Response: It is not clear to us how the Yurok Tribe's suggestion to use PacifiCorp's alternative fishway prescription as our baseline would enable appropriate meaningful comparisons with other alternatives. We defined our baseline in sections 3.4 of SD2 and in section 2.1 of the draft EIS (project operations under the existing license or the No-action Alternative). This ensures that the effects of alternative operations and environmental measures are evaluated relative to a relevant and clearly defined reference point, and not to a presumed future condition. Our approach to this baseline is consistent with the Commission's long-standing practice in conducting NEPA analyses for relicensing proceedings and it has been upheld during several court cases. Table 5-1 in the draft EIS represents a comparison of the four action alternatives; all four would enhance environmental conditions over the No-action Alternative, but assessing whether enhanced conditions would be comparable to historic conditions would be extremely difficult beyond presenting information regarding possible with and without project comparisons, which we did in sections 3.3.1, 3.3.2, and 3.3.3.

G-17 Comment: North Coast Regional Water Quality Control Board (p. 4) states that the draft EIS lacks a clear alternatives analysis as required by NEPA. It comments that the EIS must clearly define the project alternatives being considered and provide a comparison of the alternatives to support the recommendations for the Staff Alternative. The Water Board (p. 2), commenting on section 2.0, *Proposed Action and Alternatives*, of the draft EIS states that the description and evaluation of alternatives in the final EIS should be more thorough and comprehensive. Oregon Fish & Wildlife (pp. 19, 20, and 49) states that we provide comments in various sections throughout the draft EIS such as in the water quality section or in the brief section 2.4.4, *Retirement of Additional Developments*, on draft EIS p. 2-53, lines 21-31, on impacts or benefits of decommissioning but that there is no clear analysis of each alternative. NEPA requires full disclosure of benefits and impacts of all alternatives. This has not been done in the draft EIS, according to Oregon Fish & Wildlife.

Response: The draft EIS clearly defined the alternatives being considered in sections 2.1, 2.2, 2.3.2, 2.3.3, and 2.3.4 (as well as sections 5.1.1.2, 5.1.1.3, and 5.1.1.4). Our summary of the effects of the four action alternatives in the executive summary and section 5.1 of the draft EIS provides a comparison of those alternatives.

G-18 Comment: Oregon Fish & Wildlife (pp. 19-20) recommends that the EIS consider the following range of alternatives: PacifiCorp's proposal, PacifiCorp's proposal with mandatory conditions incorporated, the Staff Alternative with mandatory conditions, retirement of Copco No. 1 and Iron Gate developments, and retirement of Iron Gate, Copco Nos. 1 and 2, and J.C. Boyle developments. Cal Fish & Game (p. 3) and the Yurok Tribe (pp. 10-11) recommend that we analyze a similar set of project alternatives, except that PacifiCorp's proposal would be as amended by its April 2006 filing of alternative mandatory conditions, and Oregon Fish & Wildlife's second alternative (PacifiCorp's proposal with mandatory conditions) would not be included. This range of alternatives would provide a logical sequence for meaningful analyses. Lack of a four-dam removal analysis inappropriately narrows the draft EIS analysis. The Water Board (p. 3), California Energy Commission (p. 2), Pacific Fisheries Management Council (pp. 1 - 2), and Forest Service (p. 1) also request that we evaluate the feasibility and environmental impacts of decommissioning all four lower mainstem dams. California Energy Commission states that their consultant's report documents that decommissioning all for dams is a feasible and less costly alternative than relicensing for most of the assumptions used in the study. In addition, five tribes,[4] 18 NGOs,[5] Humboldt County, Humboldt Bay Harbor Recreation and Conservation

[4]Tribes include Quartz Valley Indian Reservation; Resighini Rancheria; and the Winnemem Wintu, Karuk, and Yurok tribes.

[5]NGOs include Northcoast Environmental Center; American Whitewater; Conservation Groups; Rogue Flyfishers; Mattole Salmon Group; Friends of Del Norte; Pacific Coast Federation of

District, City of Morro Bay (pp. 1-2), and 350 individuals (see appendix C) state that a four mainstem dam removal alternative should be included in the EIS and most entities state that this should be the preferred action. The California Indian Basketweavers Association (p. 2) states that our EIS should also include an alternative that considers the effects of decommissioning all six dams in the project area. Oregon Chapter of the American Fisheries Society (p. 1) proposes another alternative that it feels should be analyzed in the EIS: removal of Keno dam, East Side and West Side hydrofacilities, the remaining four mainstem dams, as well as "other inwater and riparian Project features." Removal of the five lower dams on the Klamath River is also supported by the Klamath Riverkeeper et al. (p. 1). The Ad Hoc Committee (p. 1), North Coast Consumer's Alliance (p. 1), Lost Coast League (p. 1), and 51 individuals (see appendix C) advocate removal of project dams, but do not specify which ones.

Response: In response to the numerous stakeholder comments on the draft EIS, we added an action alternative that considers the removal of the four downstream-most mainstem dams. Although we have considered the removal of Keno dam, we do not include it in that alternative because we do not consider it a reasonable undertaking. While we have determined that Keno dam no longer serves project purposes, it currently provides a reservoir with constant water levels that enables irrigators and other entities that withdraw water from the reservoir to do so in a reliable manner. Removal of Keno dam would result in hardship to those other entities that depend on this reservoir. The California Indian Basketweavers Association does not specify which six dams in the project area they would like considered for removal during this relicensing proceeding, so we are not able to respond to that comment. Oregon Chapter of the American Fisheries Society provides no basis for why the East Side and West Side hydro facilities, which have been determined eligible for inclusion in the National Register of Historic Places, should be removed once they are decommissioned, nor does it define what specific inwater or riparian project features it would like considered for removal.

G-19 Comment: In section 2.4.4, *Retirement of Additional Developments*, we state: "We considered the benefits and costs associated with the removal of additional developments (besides Iron Gate and Copco No. 1), but were not able to identify other reasonable dam removal alternatives for analysis in this document." Conservation Groups (pp. 3 and 8) and Pacific Coast Federation of Fishermen's Associations et al. (pp. 4-24) state that this statement implies that we concluded that the cost of removing the four dams would outweigh the benefits of the action, but the draft EIS does not disclose how these competing values were weighed or include any substantial evidence for this determination. Pacific Coast Federation of Fishermen's Associations et al. state that each of the 17 factors identified by the Interagency Task Force on NEPA Procedures in FERC Hydroelectric Licensing apply to the four mainstem project dams, and details as to why this is the case are provided for each factor. Klamath Riverkeeper et al. (pp. 6 and 7) states that NEPA does not allow reasonable alternatives that meet the purpose and need of a project to be ignored solely due to alleged economic impact on PacifiCorp, nor does it allow for only the economic impact on one related party to be disclosed and considered. The economic impacts on tribes, fishermen, coastal communities, and farmers also should be considered.

Response: As indicated in the previous comment, we now include a four-dam removal as an action alternative to evaluate in the EIS. There is a certain degree of subjectivity in interpreting which 17 factors should be assessed when considering which dams should be evaluated for possible removal. Our review of these factors during the preparation of the draft EIS led us to conclude that assessment of Copco No. 1

Fishermen's Associations et al.; Siskiyou Land Conservancy; Environmental Justice Coalition for Water; Alameda Creek Alliance; Santa Cruz Fly Fishermen; Mid Klamath Watershed Council; Redwood Region Audubon Society; Klamath Basin Audubon Society; Kalmiopsis Audubon Society; Natural Resources Services Division of the Redwood Community Action Agency; Mistwood Center for Education; and North Group, Redwood Chapter, Sierra Club.

and Iron Gate dams should be carried forward as an alternative. However, to clarify our basis for including each dam in a dam removal alternative, we now list which of the 17 factors we consider to be applicable to each dam in section 2.3.4 of this EIS.

G-20 Comment: The Klamath Riverkeeper et al. (p. 3), Hoopa Valley Tribe (pp. 11-13), and Klamath Tribes (pp. 5 and 6) state that other than the summary conclusion of unreasonableness, the draft EIS provides no explanation for its refusal to thoroughly analyze removal of Copco No. 2 dam in its decommissioning alternative. At a minimum, the EIS must include an alternative that analyzes the benefits of removing Copco No. 2, Copco No. 1, and Iron Gate dams. The estimated annualized cost to remove Copco No. 2 dam presented in the draft EIS is only slightly more than the estimated annualized cost to install upstream and downstream fish passage facilities. A three dam removal alternative is more reasonable than the two dam removal alternative presented in the draft EIS, and our failure to analyze this alternative is arbitrary and violates NEPA. Nine individuals (see appendix C) support a two or three dam removal scenario.

Response: As indicated in section 2.4.4 of the draft EIS, we discuss the consequences of removing other dams, including Copco No. 2 dam, in sections 3.3.1.2.6, 3.3.2.2.2, and 3.3.3.2.4 of the draft EIS. In summary, we concluded that, although there would be some increase in DO expected from removal of Copco No. 2 dam, it would be minimal compared to the increase expected with the removal of Copco No. 1 and Iron Gate dams. The reservoir's storage capacity is only 73 acre-feet and it is only 0.25-mile long. Consequently, the dam and reservoir have little ability to influence water quality beyond the minor incremental increase in DO that could occur. The dam is 33 feet high, and the technology to successfully pass anadromous fish over such a relatively low dam is fairly well established. As indicated in previous comment responses, we now intend to evaluate a four-dam removal alternative, which would include Copco No. 2 dam. We conclude that a three dam removal alternative would not provide substantially different perspectives than analyzing a two- and four-dam removal alternative.

G-21 Comment: North Coast Regional Water Quality Control Board (p. 4), Klamath Riverkeeper et al. (pp. 5 and 6), Josh Strange (p. 5), American Sportfishing Association (p. 2), the Hoopa Valley Tribe (pp. 13-15), and Klamath Tribes (pp.6 and 7) state that the EIS should consider a full project decommissioning alternative to fully analyze reasonably foreseeable project alternatives. The tribes and Riverkeeper comment that it is entirely possible that PacifiCorp may decide that it is in the best interest of its ratepayers to decommission the project. In addition, the tribes and Riverkeeper note that the Commission is not bound to issue a license in this proceeding if it determines that no license would satisfy the FPA's comprehensive development standard. Given the impacts of the project on water quality and the fishery, and the associated hardship on tribes and commercial fishermen, this might be a reasonable conclusion for the Commission to reach. The positive and negative impacts of full project decommissioning should therefore be analyzed in the EIS to provide the public and the Commission with the full range of information necessary to make an informed decision. Because decommissioning is a foreseeable outcome, failure to analyze decommissioning is unreasonable. NMFS (p. 49) and Cal Fish & Game (pp. 40 and 41) state they concur with the draft EIS analysis of partial dam removal, but that a complete decommissioning alternative should be rigorously evaluated. The draft EIS analysis implies that the Staff Alternative did not include dam removal due to concerns over very high costs of decommissioning facilities involving contaminated sediments. The recent information provided by the State Coastal Conservancy (GEC, 2006) reveals that this concern is unfounded and that the costs of removal would be far less than anticipated.

Response: PacifiCorp does not propose to decommission the project, but it would be free to not to accept an issued license if it determines that the conditions of a new license are not consistent with its corporate objectives. In that case, a separate decommissioning proceeding would occur, and the environmental effects of decommissioning all project developments would be considered in a separate NEPA analysis.

However, we consider the new four dam removal alternative to be similar in its effects on the mainstem Klamath River to a project decommissioning alternative. It is not a foregone conclusion that the Commission would decide to issue a new license in any relicensing proceeding.

G-22 Comment: American Whitewater (pp. 7 and 10) requests that we pull together the cost-benefit analysis of dam removal into one section of the document rather than have small pieces scattered throughout the EIS. "The benefits of dam removal are many and massive, but get lost in the weeds of this necessarily large document. These benefits are never weighed in detail against the cost." The EIS should quantify the economic, recreational, cultural, and ecological benefits of removal of each dam and all of them. These values should be totaled for at least one license term and weighed against the costs of dam removal, and the costs of no removal against the benefits of the Staff Alternative.

Response: The primary considerations that support the case for dam removal are the potential for improving water quality conditions in the lower Klamath River and for restoring anadromous fisheries, including the commercially important fall Chinook salmon, the federally listed coho salmon, anadromous salmonids important to the tribes and recreational fishermen, and other aquatic species of cultural importance to the tribes. We acknowledge that dam removal could contribute to these objectives, but quantifying these potential benefits would be speculative. Removal of Iron Gate dam would also eliminate the cold water supply needed to operate Iron Gate Hatchery, and the immediate closure of the hatchery would have a substantive adverse effect on important commercial, tribal, and recreational fisheries. As a result of these considerations, we have modified the Staff Alternative to include a comprehensive approach to restoring anadromous fish runs which would address uncertainties regarding the effects of project reservoirs on downstream water quality conditions, explore potential methods for addressing water quality and disease issues, proceed immediately with the restoration of anadromous fish runs to habitat upstream of Iron Gate dam, and assess critical uncertainties regarding the effectiveness of volitional and non-volitional passage techniques. We conclude that this represents a prudent path to determine the most beneficial approach for restoring anadromous fisheries in the Klamath River. We agree with American Whitewater that summarizing the costs and benefits of dam removal in one section of the EIS would be helpful to the reader and have added a table that compares these costs and benefits, along with uncertainties associated with dam removal to section 5.2.21 of this EIS.

G-23 Comment: Oregon Fish & Wildlife (p. 20) comments that the two-dam removal alternative is not well defined. It is unclear if the Commission staff is proposing to continue peaking at J.C. Boyle and reregulate at Copco No. 2 dam. Furthermore, when Copco dam is removed, the potential for overfill of sediment into Copco No. 2 may limit reservoir capacity to re-regulate peaking at J.C. Boyle. Commission staff needs to clarify its proposal and analysis of Measure 21P on p. 2-51 as to whether operation of Copco No. 2 dam would be to re-regulate flows, or identify if J.C. Boyle and Copco No. 2 development would be managed as run-of-river facilities. The Forest Service (p. 2) also states that the dam retirement alternative lacks detail about how the action would be conducted. The alternative description in section 2.3.4 of the draft EIS simply lists the environmental measures in the PacifiCorp proposal and Staff Alternative that would be removed or changed. The Water Board (pp. 2 and 3) also expresses lack of clarity regarding whether J.C. Boyle development would operate in a peaking or run-of-river mode, but assumes peaking would continue and base load operations would occur at Copco No. 1 powerhouse. If this assumption is correct, and anadromous fish passage is provided at Copco No. 2 dam, our EIS should evaluate the environmental effects of peaking operations on anadromous fish between Copco No. 2 dam and the J.C. Boyle development, describe the expected flow regime downstream of Copco No. 2 development, and the effects of this flow regime on beneficial uses of the Klamath River. Similarly, Cal Fish & Game (p. 40) anticipates no benefit from leaving in Copco No. 2 dam given the sediment load that would be delivered with the removal of Copco No. 1 dam. Copco No. 2 reservoir would rapidly fill with sediment, leaving a facility that impedes timely fish passage and interrupts desired natural sediment processes. If J.C. Boyle development is retained, it would need to operate in a run-of-river mode, since

there would be no ability of Copco No. 2 to re-regulate peaking flows, and equipped with mandatory fishways. PacifiCorp (pp. 2-8) also concludes that J.C. Boyle development would need to operate in a run-of-river mode under a two dam removal alternative, which would eliminate the need for measure 24S (a feasibility study for enhancing communications along the peaking reach). Our EIS should consider this reduction in power benefit and associated substantial maintenance costs.

Response: We define the specific measures that we would recommend under the Two-Dam Removal Alternative in section 5.1.1.4 and discuss this alternative further in section 5.2.21 of the draft EIS. On lines 15-17, we specify that the flows released from Copco No. 2 development (as measured at the USGS gage downstream of Iron Gate dam) would be consistent with Reclamation's Klamath Operations Plans and the applicable BiOps. If coho salmon are delisted at some point in the future, ramping below the Copco No. 2 powerhouse would be limited to 2 inches per hour and 12 inches per day, in conjunction with fish stranding studies to determine whether more restrictive ramp rates are warranted. As PacifiCorp notes in its comment, it is unlikely that substantive peaking would be possible if Copco No. 1 and Iron Gate dams are removed, and our assumption for costing purposes in this EIS is that J.C. Boyle would operate in essentially a run-of-river mode under this alternative. Although maintenance costs associated with sediment management at Copco No. 2 development following removal of Copco No. 1 dam would initially be high, we expect it would return to its current levels following the flushing of accumulated sediments from Copco reservoir.

G-24 Comment: Oregon Fish & Wildlife (p. 17-18) states its concerns that the Staff Alternative is merely a plan, avoids direct mitigation of impacts, and results in deferred decision making. By deferring decisions to a plan, staff cannot quantify or analyze unknown outcomes and allows it to defer decision making. Therefore, what results are unknown impacts, costs, benefits, risks, and secondary impacts associated with that plan. Rogue Flyfishers (p. 3) state that, in light of the ALJ findings, the Staff Alternative is not scientifically supportable, and would only delay taking needed action to improve Klamath River fisheries. Pacific Coast Federation of Fishermen's Associations et al. (pp. 24-25), Klamath Riverkeeper et al. (p. 8), Quartz Valley Indian Reservation (pp. 24-25), Karuk Tribe, and Resighini Rancheria (pp. 24 - 25) make similar comments. They state there is no evidence that actions in the recommended plans (the disease and water quality management plans are cited as examples) can effectively mitigate project impacts; PacifiCorp may not cooperate in plan development and implementation; the recommended plans lack any specific goals and concrete objectives, milestones, or consequences of failing to meet objectives; and potential actions in the plans, such as use of algaecide or dragging chains across the stream bottom to dislodge *Cladophora*, are too simplistic and unlikely to produce necessary results and have a high probability of producing unintended negative consequences. Pacific Coast Federation of Fishermen's Associations et al. lists 18 plans that it comments are not specific enough regarding objectives, mitigation measures, and defined timeframes. Rather than relying on insubstantial and uncertain "plans for plans" the Quartz Valley Indian Reservation, Karuk Tribe, and Resighini Rancheria recommend that we instead recommend the necessary dam removals.

Response: Our intent in many of the plans that we recommend in the draft EIS is to establish a framework for the expertise of local resource and land management agencies and tribes to be incorporated into specific solutions for project-related issues. In some instances, such as PacifiCorp's proposed hypolimnetic oxygenation system, numerous parties expressed concerns that a specific measure would result in unintended consequences, in which case we deferred implementation of such measures until further study could be completed (as recommended by resource agencies). We have modified several of our recommended plans to more clearly specify the objectives, milestones for specific actions, and follow-up actions that would be implemented if objectives are not initially achieved. We continue to conclude that some issues, such as controlling nutrient levels within project waters, require cooperative solutions, rather than the Commission specifying specific measures without input from other entities. Other plans that we recommend, such as sediment augmentation, are virtually identical to the approach

recommended by resource agencies, including goals, studies, and timeframes during which specific actions would be taken. In the case of sediment augmentation, the only aspect that we dispute is the specific amount of gravel that should be placed in the J.C. Boyle bypassed reach and downstream of Iron Gate dam on an annual basis. We reviewed the 18 plans that Pacific Coast Federation of Fishermen's Associations et al. indicate lack detail and find that 10 of them are specific regarding what is to be achieved and when it would be achieved, and one plan (hatchery genetics management plan) does not appear to be a plan that we recommended in the draft EIS at all. One plan (disease monitoring and management) is listed twice and two other plans (water quality and comprehensive reservoir management plans) seem to refer to a single plan that we recommend; a comprehensive water quality management plan. For the five plans that seemed to lack specificity in the draft EIS (anadromous fish restoration, temperature management, water quality management, fish disease monitoring and management, and aquatic resources monitoring and management), we added details regarding the recommended content of the plans to the extent we consider to be appropriate.

G-25 Comment: Joyce King (p. 2) states that the draft EIS does not seem to include: "Risk analyses for projects which include statistical probabilities for accidents, miscalculations, and mistakes, and the scope of potential damages or failures to meet objectives, especially where mitigations are concerned."

Response: Without additional information about the specific intent of this comment, we are not able to respond, other than to point out that implementation of proposed and recommended protection and enhancement measures do not always follow statistical distributions that can be estimated or calculated.

G-26 Comment: Oregon Fish & Wildlife (pp. 12, 25-27) states that rejection of several Oregon Fish & Wildlife 10(j) recommendations by using the explanation of either being outside the scope of 10(j) or inconsistent with the comprehensive planning standard of section 10(a) contradicts the requirements of the FPA. Oregon Fish & Wildlife states that Commission staff has rejected recommendations based on insubstantial logic, failed to adequately justify rejections in some cases, and ignored the opinions of expert fisheries agencies regarding current conditions and resource needs. Commission staff should avoid not using or understanding the analyses provided by the fish and wildlife agencies, nor rely exclusively on the misleading evidence from poorly done studies conducted by PacifiCorp. Commission staff seems to believe that the FPA does not require full mitigation. The FPA does not prevent mitigation and in fact promotes mitigation via 10(j) recommendations in the FPA. Furthermore, the FPA requires that the Commission address each section 10(j) recommendation, indicating how the recommendation is inconsistent with the FPA or other law, and how the Commission's preferred condition complies with the requirement to adopt adequate protection, mitigation and enhancement requirements for fish and wildlife impacted by the project.

Response: We analyzed all environmental measures offered by agencies with 10(j) authority in section 3 of the draft EIS, regardless of whether or not we concluded in section 5.4.1 of the draft EIS that a measure was within the scope of section 10(j). NEPA requires us to conduct an independent analysis of environmental issues and measures that would appropriately address those issues. Our analysis considered studies conducted by PacifiCorp as well as others that are part of the record for this proceeding. However, an applicant is required to conduct appropriate studies to support its license application, and such studies typically are the basis for much of our analysis, even though there may be disagreement with how the studies were conducted. In our draft EIS, we pointed out aspects of specific studies that we concluded were questionable. We have attempted to clarify in this EIS aspects of our analysis that may have been unclear in our draft EIS. We have not ignored any opinions of resource agencies in our analysis, although our analysis does, in some cases, reach different conclusions than those reached by the agencies. Any rejection of a measure that we determined to be outside the scope of section 10(j) was done so based on our analysis of the environmental benefits that the measure would accrue and the associated cost of implementing the measure, as required by section 10(a) of the FPA, not because the

measure was outside the scope of section 10(j). As table 5-2 in the draft EIS shows, we agreed with many environmental measures that we concluded were outside the scope of section 10(j). If Oregon Fish & Wildlife means by "full mitigation" restoring habitat influenced by an existing project to pre-project conditions during a relicensing proceeding, we are uncertain where such a requirement is specified in the FPA, and the Staff Alternative does not seek to achieve this objective. Environmental measures included in the Staff Alternative are intended to protect and enhance the environment from project-related effects. We indicated in table 5-2 our reasons for not adopting specific measures for less complex measures and discuss our reasons for not accepting more complex measures in section 5.2 of the draft EIS. Our reasons for rejecting measures within the scope of 10(j) are generally based on either a finding that the cost of implementing a measure is not warranted by the environmental benefit or an agency has not provided sufficient evidence that a measure is needed to address project-related effects. In some instances, recommendations made by state agencies differed from those made by federal agencies, so our acceptance of one measure by default resulted in a rejection of another measure.

G-27 Comment: Oregon Fish & Wildlife comments (p. 28) that the draft EIS states that some 10(j) recommendations are not specific measure to protect, mitigate, or enhance fish and wildlife resources. It comments that the draft EIS states that the Staff Alternative would adopt significant mitigation measures, but then in some cases, only proposes study, monitoring, or planning, with negligible details as to how any actual mitigation may take place. Oregon Fish & Wildlife states that we are applying a double standard and cannot label monitoring, studying, and planning as "mitigation" when the proposal comes from Commission staff, and then reject similar proposals from agencies as too unclear. It is disingenuous for Commission staff to reject study proposals because such studies "could have been completed prior to licensing" when it failed to require these studies prior to licensing.

Response: As we noted in the previous response, we did not reject any measure because it was outside the scope of section 10(j). We did consider certain measures to be outside the scope of section 10(j) because they were not specific measures to protect fish and wildlife, as we noted in footnote "b" of table 5-2 in the draft EIS. As noted in the previous response, a finding that a measure is outside the purview of section 10(j) because it is not a specific measure to protect fish and wildlife does not equate to a finding that the measure is unwarranted, but rather it does not meet the legal requirements to be considered under section 10(j). In our draft EIS we did not consider any measure pertaining to studies to be outside the scope of section 10(j) because such studies could have been completed prior to licensing. Our intent in many of the plans pertaining to monitoring, studying, and planning that we recommended in the draft EIS was to enable the resource agencies with expertise in regional resources to play a major role in determining the specific measures that would be implemented in response to the studying and monitoring. We considered this approach to be reasonable, given the disagreement among stakeholders regarding previous study implementation and results. However, given the response to our draft EIS, we have modified many of our recommendations in this EIS to include timeframes when specific actions would be taken to protect and enhance fish and wildlife resources.

G-28 Comment: Oregon Fish & Wildlife (p. 19-21) and the Water Board (pp. 3 and 4) comment that while using existing conditions as the baseline may be appropriate under NEPA; doing so obscures the ongoing impacts of the project and renders the EIS less valuable to the Commission as a decision-making tool. Existing conditions do not represent no-action because existing conditions represent conditions at a fixed point in time, whereas under the No-Action Alternative, there will be changes in the environment. The Water Board states that we should compare the No-Action Alternative to existing conditions (a more appropriate baseline) and the other alternatives in order to show what would happen if the proposed action is not taken. Furthermore, Commission staff fails to fully describe the baseline condition in each resource section. It is important when describing the baseline condition to disclose whether the baseline is static or moving. The baseline cannot be assumed to be a static condition. No-action or the existing project is a moving impact with declining conditions for water quality and fish populations. Water quality and

fisheries in the Klamath River are declining, which results in a baseline condition that is on a declining trajectory. As required by NEPA, the Commission staff needs to fully disclose the ongoing and continuous impacts of the baseline condition and the consequences to natural resources.

Response: As we indicated in sections 4.4 of SD2 and 2.1 of the draft EIS, the No-Action Alternative represents a continuation of operations under the terms and conditions of the existing license, and this is our baseline for environmental comparison. We recognize that PacifiCorp may, at times, operate the project in a different manner for a variety of reasons (e.g., to provide lower or higher minimum flows as specified by Reclamation as it attempts to comply with its BiOp). Therefore, the existing baseline conditions described in the affected environment portion of each resource section in section 3 of the draft EIS could at times be slightly different than they may have been historically. Because environmental studies conducted during pre-filing consultation reflect existing conditions, our baseline for comparison reflects the point in time when the studies were conducted. We acknowledge that water quality data presented in section 3.3.2.1.2 of the draft EIS is primarily from the last 10 years. This information is most representative of current conditions and reflects areas most in need of enhancement. We note that figure 3-29 of the draft EIS shows total phosphorus values of outflow from Upper Klamath Lake over a 9 year period and provides an indication of the variable nature of this nutrient that enters the project. We discuss overall water quality general trends in section 3.3.2.3, Cumulative Effects. Tables 3-47, 3-48, 3-51, 3-54, 3-55, 3-56 and figures 3-40, 3-41,3-42, 3-43, 3-44, 3-45, 3-46, 3-51, 3-52, 3-53, 3-54, 3-56, 3-57, 3-58, 3-59 in the draft EIS all show multi-year trends of fisheries in the Klamath River Basin, some for periods of over 30 years. These tables and figures clearly do not depict a static condition of fisheries resources. See also our response to G-16.

G-29 Comment: The Yurok Tribe (pp. 11 and 12) states that the cumulative effects analysis in the draft EIS does not address the impacts of project relicensing, including foreseeable impacts on the Klamath River fishery and other culturally significant tribal resources. The tribe requests that an adequate cumulative effects analysis be incorporated into the EIS, including recommendations for mitigation of identified cumulative effects.

Response: We defined the scope of our cumulative effects analysis in section 3.2 of the draft EIS and discuss the effects in sections 3.3.1.3, 3.3.2.3, 3.3.3.3, 3.3.5.3, and 3.3.8.3. The purpose of these sections is to disclose cumulative effects, not necessarily put forward our recommendations regarding how any such effects should be addressed. Project-specific effects are addressed in the environmental effects section of each resource section and measures that would address such effects, some of which are cumulative effects, analyzed. We do not make our recommendations in the cumulative effects section of the EIS, but in section 5. Specific measures included in the Staff Alternative that would address cumulative effects include sediment augmentation downstream of Iron Gate dam, a project operation management plan, a comprehensive water quality management program, and an integrated fish passage and disease management program.

G-30 Comment: Oregon Fish & Wildlife (p. 21) comments the description of Unavoidable Adverse Effects in the Staff Alternative is scant and does not clearly describe the unavoidable adverse impacts of each alternative. By not disclosing unavoidable adverse effects, the Staff Alternative avoids fully mitigating these effects. Similarly, the Hoopa Valley Tribe (pp. 42-44) states that an adverse effect is not properly characterized as “unavoidable” if there is an alternative that would mitigate the adverse effect. Our draft EIS admits that removal of Iron Gate and Copco No. 1 dams would mitigate many of the adverse effects that the draft EIS erroneously describes as “unavoidable.”

Response: Our sections pertaining to unavoidable adverse effects are indeed brief, which is because we consider most adverse effects associated with relicensing the project to be avoidable. If one project action alternative has unavoidable adverse effects associated with it, the other action alternatives would also

have this unavoidable adverse effect, in most cases, or the effect would be avoidable. In some instances, the Two-Dam Removal Alternative that we analyzed in the draft EIS would avoid some adverse effects, and we identified those avoided effects in sections 3.3.2.4, 3.3.3.4, and 3.3.5.4 of the draft EIS. This is a relicensing proceeding and we consider it a reasonable premise to assume that at least one hydroelectric generating development would remain in operation following relicensing. Consequently, there would be some unavoidable adverse effects associated with the continued operation of any relicensed facilities. The Commission also could decide not to issue a new license for this project and if removal of project dams should be a consequence of a license denial, project-related adverse effects would indeed be avoided.

G-31 Comment: PacifiCorp (5-1) states that our recommendation in the Staff Alternative to consult with NMFS, Interior, and Reclamation during the development of the decommissioning plans for the East Side and West Side developments is acceptable and would not affect its decision to decommission both developments.

Response: We appreciate PacifiCorp's concurrence with our recommendation that a decommissioning plan for the East Side and Westside developments should be developed in consultation with NMFS, Interior, and Reclamation and have modified this proposed measure accordingly in this EIS.

G-32 Comment: Oregon Fish & Wildlife (p. 229) states that the Staff Alternative only includes NMFS, FWS, and Reclamation during development of the decommissioning plans for the East Side and West Side developments. Since Oregon Fish & Wildlife is the state agency that manages the state's fish and wildlife resources with associated statutes and policies, Oregon Fish & Wildlife needs to be included as one of the consulted agencies.

Response: We agree and have added Oregon Fish & Wildlife to the entities that we recommend PacifiCorp consult with during the development of the decommissioning plan for the East Side and West Side developments.

G-33 Comment: Oregon Fish & Wildlife comments (p. 229) that since the Staff Alternative in the draft EIS does not completely describe the scope of the decommissioning plan for the East Side and West Side developments that would be required in a new license, it is not possible to provide a complete review of the adequacy of the plan described in 6P (draft EIS, page 5-2, lines 24-29).

Response: We only provide a brief summary of the proposed and recommended decommissioning plan on page 5-2 of the draft EIS. We identify the specific issues that we expect to be addressed in the decommissioning plan in section 5.2.18, on page 5-54 of the draft EIS. The specific decommissioning process of both developments proposed by PacifiCorp is described in section 2.2.1.1 (page 2-17) of the draft EIS. We consider the details provided in these two sections of the draft EIS to be sufficient to define the scope of the decommissioning plan.

G-34 Comment: Oregon Parks & Rec (p. 2) states that PacifiCorp did not propose decommissioning the Keno development in their license application, they proposed only to remove it from the project boundary.

Response: In its Policy Statement pertaining to Project Decommissioning at Relicensing, dated December 14, 1994, the Commission broadly defines the term decommissioning to range from simply shutting down the power operations to tearing out all parts of the project, including the dam, and restoring the site to its pre-project condition. In essence, decommissioning refers to relinquishment of Commission jurisdiction and can occur with or without dam removal. In this case, PacifiCorp proposes to decommission the development, but retain the dam. If Keno development were no longer necessary for

operation and maintenance of the project or for other project purposes, it would no longer remain in the project boundary.

G-35 Comment: Interior (p. 65) states, based on page xxix, line 41, of our draft EIS: "There are no mandatory conditions associated with East Side, West Side and Keno developments. What proposal does the Commission staff make for PacifiCorp to rehabilitate, correctly recontour, revegetate with appropriate native vegetation, and enhance these sites when the facilities are decommissioned?"

Response: Although not overtly stated, we assume Interior's comment pertains to the East Side and West Side developments, the only locations where recontouring and revegetation would be appropriate following decommissioning. A small portion of the land within the existing project boundary at the East Side and West Side developments is federally owned and managed by Reclamation. Reclamation specified 4(e) conditions, most of which are listed in table 2-4 of the draft EIS, that make the assumption that both of these developments would remain under Commission jurisdiction. Since PacifiCorp proposes and we recommend that both developments be decommissioned in an orderly manner which would be defined in detail in our recommended decommissioning plan, the Commission would no longer have jurisdiction over these developments once decommissioning is completed. None of Reclamation's 4(e) measures pertain to decommissioning. Consequently, the meaning of Interior's comment is unclear to us.

G-36 Comment: Interior (p. 66) notes that page xxvii, lines 18-22, of our draft EIS, lists the principal issues addressed in the document. One of the issues mentioned is the effect of project operations on resources of concern to various tribes. This statement does not give due credence to the depth of the issue with regards to project operation effects to tribes. The Commission, as an agency of the United States, has a trust responsibility to federally-recognized tribes and thus must, in this licensing decision, ensure that any new license for the project protects tribal trust rights, including the protection of tribal lands, fishing and water rights, cultural resources, and other resources of concern to the tribes affected by this project. Interior states that section 1.1 of our EIS (*Purpose of Action*) should mention the Commission's trust responsibility to tribes. One of the purposes is the fulfillment of the trust responsibility to tribes, which may include creating conditions more beneficial to anadromous fish survival and passage. The Hoopa Valley Tribe (pp. 9 and 48), Karuk Tribe (p. 8), Yurok Tribe (pp. 4-9), and Klamath Tribes (pp. 1 and 2) state that the draft EIS fails to evaluate whether the project can be licensed consistent with the federal laws and executive orders that reserve and protect the Tribe's rights to water and fish and its tribal trust assets. Trust resources, effects on tribal lands, and the Commission's trust obligations are not even mentioned in the draft EIS, let alone analyzed. Similarly, the Northcoast Environmental Center (pp. 2 and 3) states that there is no analysis in the draft EIS of federal, legally established tribal trust species obligations and other than one sentence on page 3-502 that acknowledges the elements included in the Klamath Riverscape, there is no explicit analysis of water or ample fish in the river as cultural resource for Klamath tribes whose physical, social, and spiritual existence depends on those resources. Klamath Riverkeeper et al. (p. 9) states that the proposed alternative is a violation of tribal trust responsibilities and tribal constitution rights and although this cannot be mitigated, the draft EIS did not disclose the myriad of ways the Commission is violating tribal rights.

Response: In section 3.3.9.1.2, *Cultural History Overview*, of the EIS, we have added information about resources influenced by the project that are important to the tribes from a physical, social, and spiritual perspective. We also added text to section 3.3.8.1.1, *Socioeconomics, Demographic Characteristics*, that discusses the effects that lack of access to traditional food sources has had on tribal members. Section 3.3.8.1.2, *Project-related Economic Sectors*, of the draft EIS already discussed tribal fisheries, but we enhanced that discussion in this EIS based on information provided by the tribes in response to the draft EIS. The effects of the existing and proposed project on natural resources that are important to the tribes and other stakeholders are discussed in sections 3.3.1, *Geology and Soils*, 3.3.2, *Water Resources*, 3.3.3,

Aquatic Resources, 3.3.4, *Terrestrial Resources*, and 3.3.5, *Threatened and Endangered Species*. Also, see our response to the following comment.

G-37 Comment: The Yurok Tribe (pp. 7 and 8) states that the draft EIS fails to acknowledge the Commission's responsibility to protect Yurok tribal trust resources, which include, but are not limited to fall and spring Chinook salmon, spring Chinook salmon, summer, fall, and winter steelhead, coho salmon, Pacific and other non-anadromous lamprey, sturgeon, and eulachon.

Response: Our intent is to protect and enhance habitat for those species that are or may be affected by continued project operations. Our recommendations in this EIS would serve to protect or enhance habitat for all of the species specified by the Yurok Tribe with the possible exception of eulachon. As we state on page 3-204 of the draft EIS, eulachon enter the lower 8 miles of the Klamath River during the spring to spawn, and therefore would not likely be present during periods of poor water quality. Consequently, it is unlikely that project operations would influence this species and that it would require protection from project effects.

G-38 Comment: Interior (p. 66) states that on page 1-3 of the draft EIS we note that the project represents about 2 percent of PacifiCorp's installed capacity. Interior suggests that our revised section 1.2 (*Need for Power*) also should note that this is about 1 percent of total sales. Quartz Valley Indian Reservation (pp. 23 and 24), Resighini Rancheria, and Karuk Tribe (pp. 2 and 3) similarly state that the EIS should acknowledge that the project is an extremely small contributor to the electrical supply, whether or not the project stays in production would have little or no bearing on the overall electrical supply, and the project has a much higher environmental impact than other hydroelectric projects in California because of its effects on anadromous fish. The EIS should explain why we ignore or reject California Energy Commission statements to this effect in a previously filed report.

Response: Representation of the installed capacity of the project compared with PacifiCorp's total generating capacity adequately reflects the contribution of the project to the total mix of sources. Regardless of its relative size, the hydroelectric facilities of the project provide valuable generation from a renewable fuel source, sufficient to fuel 70,000 homes.

G-39 Comment: PacifiCorp (p. 1-1), commenting on page 1-3, lines 1-3, of the draft EIS, notes that it currently serves 1.6 million people, and PacifiCorp operates as Pacific Power in Oregon, Washington, and California and as Rocky Mountain Power in Utah, Idaho, and Wyoming.

Response: Based on PacifiCorp's December 31, 2006, Form 10-K filing to the U.S. Securities and Exchange Commission (SEC), it now has more than 1.6 million customers. We revised the number of customers in this EIS. We also revised the text to reflect the name change from Utah Power to Rocky Mountain Power and the states covered by Pacific Power and Rocky Mountain Power based on the most current information from PacifiCorp.

G-40 Comment: PacifiCorp (p. 1-1), commenting on page 1-3, lines 29-31, of the draft EIS, indicates that, although many existing projects within the WECC have recently been relicensed, they will produce less electricity because of environmental requirements and thus be less effective in their ability to provide capacity benefits on both an instantaneous and sustained basis. Oregon Department of Energy (p. 1) points out that the project has been operated as a peaking resource and is likely to be less useful for peaking, given reasonable relicensing conditions, therefore loss of a hydro resource would have less of an impact in the northwest power pool.

Response: We acknowledge that, if relicensed, the ability of the project to provide peaking capacity would likely diminish to some extent. Lost peaking capability would need to be provided from other

facilities in the area, such as the 95-MW Klamath Generation Peakers facility currently on line or new facilities.

G-41 Comment: On page 1-3, lines 25-30, of the draft EIS, we state: "Due to the significant percentage of hydro generation in the region, WECC expects the ability to meet peak demand will be adequate for the next 10 years. Capacity margins for the winter-peaking NWPP area range from 23.7 to 28.6 percent for the next 10 years. We conclude that the WECC and NWPP area sub-region have a need for power over the near term." Quartz Valley Indian Reservation (p. 23) and Karuk Tribe state that this is contradictory and should be remedied in the EIS by stating that project electricity is not needed in the near-term. Oregon Department of Energy (p. 1) comments that section 1.2, *Need for Power*, of the draft EIS is cursory and incomplete. It describes WECC analysis of capacity needs and reports west-wide capacity growth and reserve margins. The draft EIS analysis mixes information related to west-wide needs and northwest needs. By doing so, the need-for-power and reserve margin deficits of the west mask a surplus in the reserve capacity for the northwest region through 2014.

Response: We updated the discussion in section 1.2 of the draft EIS based on the most recent information available from WECC. Although the year of need is uncertain, the need for additional capacity within the next 10 years exists. Any capacity removed from available resources accelerates the year of need. Current estimates include any generating capacity now planned or under construction. The status of some planned projects is questionable, and some of the projects are not expected to be built, including the 1,150 MW COB Energy Facility that was canceled in February 2007. Additional capacity will be needed and will require adequate lead time for siting approval, design, and construction. Also, while the Northwest may not be constrained from a capacity standpoint, it is constrained from an energy standpoint, so the energy from the project may currently be more important to the region than capacity. We added an additional discussion pertaining to these issues in this EIS.

G-42 Comment: Oregon Department of Energy (p. 1) states there are several alternatives for carbon-free generating resources available in the northwest and we should balance the small number of megawatts produced by the project against the significant impacts of continued dam operation.

Response: The primary carbon-free generating resources proposed for addition in the near future in this region are wind turbines at various locations. PacifiCorp is currently considering the installation of 1,400 MW of wind power to its system over the next 10 years, based on its current load forecasts. Any capacity taken out of the system in the near term, such as if project facilities were removed from the system due to decommissioning, accelerates the year of need for new facilities. In our EIS, we disclose the expected environmental effects of relicensing the project, but the Commission would typically balance such effects against the energy produced by the project in its order pertaining to this proceeding.

G-43 Comment: The city of Yreka (p. 6) states that the costs of developing replacement power supplies if any of the project dams are removed should be considered in the cost benefit analysis of the EIS.

Response: We cannot predict with certainty how the power lost due to potential dam removals would be replaced. There are planned additions to power supplies in the region, but those facilities are already factored into supply needs. The loss of any additional capacity is not considered in those analyses. We updated section 1.2 of this EIS as much as possible, based on information made available since the draft EIS was issued.

G-44 Comment: Conservation Groups (pp. 7, 8, and 20) and Rogue Flyfishers (p. 3) state that the draft EIS does not adequately analyze the Bureau of Reclamation's "power rate" 4(e) condition because we consider it an administrative rather than and environmental measure. In previous rulings pertaining to this project and efforts to have the Commission set the rates, the Commission ruled that it "clearly has no

jurisdiction over PacifiCorp retail rates." Conservation Groups and Rogue Flyfishers state that the Commission lacks jurisdiction to include such a 4(e) condition in a new license, and the EIS should state this. Conservation Groups further state that Reclamation is also without jurisdiction to set 4(e) conditions if Keno development is excluded from the project because there would be no Reclamation land adjacent to the project, and even if Keno development remains in the project, Reclamation does not have the authority to set power rates and this is an inappropriate and unjustified condition outside the scope of its conditioning authority. Rogue Flyfishers adds that reduced power rates are shown to increase out-of stream water use and low flows are another problem adversely affecting Klamath River fisheries.

Response: On page 3-492, lines 12-17, of the draft EIS, we state that the Oregon and California Public Utilities commissions ruled that the irrigators should be included under their standard irrigation rates, rather than the rates set under the 1956 contract. The Commission has no authority to set rates charged by a utility. It is premature for the Commission to make a determination regarding whether Reclamation has authority to specify power rates as a condition of a new license. If no federal land managed by Reclamation is within the jurisdiction of the Commission under a new license, there would be no basis for the Commission to enforce Reclamation's 4(e) conditions.

G-45 Comment: On page 2-53, lines 8-9, of the draft EIS, we state: "Decommissioning of the project would result in the loss of an annual average of 716,820 gigawatt-hours of energy, which would need to be replaced by an alternate source. Oregon Department of Energy states that this value is a factor of one thousand too high.

Response: Oregon Department of Energy is correct, and we have corrected this error at the indicated location in the EIS. Elsewhere in the draft EIS (e.g., table 4-1 in the developmental analysis section) we refer to the correct value of 716,820 megawatt-hours.

G-46 Comment: PacifiCorp (pp. 2-1 and 3-16), commenting on pages 2-1, lines 25-26, and 3-130, line 34, of the draft EIS, states that it continues to operate the Link River dam under an annual contract with Reclamation, renewable at the parties' discretion.

Response: We modified both indicated pages of the EIS to reflect this information.

G-47 Comment: PacifiCorp (p. 2-1), commenting on page 2-14, line 5, of the draft EIS, states that the extension wall is steel, not concrete.

Response: We corrected the indicated text in accordance with PacifiCorp's comment.

G-48 Comment: Interior (p. 98) and Oregon Fish & Wildlife (p. 33) note that, on page 5-83 of our draft EIS, the "Long Range Plan for the Klamath River Basin conservation area fishery restoration program" is listed incorrectly under the comprehensive plans of the state of California. The appropriate place to list this plan is under the plans of the United States.

Response: Our listing of Commission-approved comprehensive plans in section 5.5 of the draft EIS is based on our review of the most recent listing of such plans. This listing can be reviewed via the Commission's web site; the current version was updated in September 2006. The Long Range Plan for the Klamath River Basin conservation area fishery restoration program is listed on page 9 of that document as a comprehensive plan that pertains to California, as correctly reflected in our draft EIS. We recognize that this plan also pertains to portions of the Klamath River Basin that are within Oregon. Comprehensive plans "of the United States" (which begin on page 76 of the indicated document) are broad overarching plans that encompass either the entire country or regions of the country. By listing it as a California plan, the geographical focus of this specific plan can more readily be discerned, but this

does not imply that it is a plan developed only by the state of California or that it is not applicable to the state of Oregon.

G-49 Comment: Oregon Fish & Wildlife states (p. 32) that the list of comprehensive plans in section 5.5 of the draft EIS does not include the Oregon Conservation Strategy (Oregon Fish & Wildlife, 2006) and requests that the document be accepted by the Commission as a comprehensive plan. It requests that the final EIS analyze how the project and the recommended license conditions would affect Oregon's ability to manage for fish and wildlife resources via its comprehensive plans, including the Oregon Conservation Strategy.

Response: Although the Oregon Conservation Strategy has not yet been approved by the Commission as a comprehensive plan pursuant to the provisions of section 10(a)(2) of the FPA, the Staff Alternative is not in conflict with that document. The stated overall goals for the Oregon Conservation Strategy are to maintain healthy fish and wildlife populations by maintaining and restoring functioning habitats, preventing declines of at-risk species, and reversing any declines in these resources where possible. In the Klamath Mountain Ecoregion portion of that document, particular mention is made of the need for broad-scale conservation strategies that focus on restoring and maintaining more natural ecosystem processes and functions within a landscape that is managed primarily for other values. The document specifically recommends improving fish passage and maintaining or enhancing in-channel watershed function, connection to riparian habitats, flow, and hydrology. The Staff Alternative described in this EIS, as well as the Staff Alternative with Mandatory Conditions and the two and four dam removal action alternatives, would improve fish passage for resident and anadromous fish. Measures that we include in the Staff Alternative that pertain to sediment placement in the J.C. Boyle bypassed reach, increasing minimum flows at the J.C. Boyle bypassed reach, reducing ramping rates in the bypassed reach and peaking reach, and riparian habitat enhancements would maintain or enhance in-channel watershed functions, connection to riparian habitats, flow, and hydrology.

G-50 Comment: The Hoopa Valley Tribe (p. 32) comments that the listing of comprehensive plans in section 5.5 improperly omits the California recovery strategy for California coho salmon, the Hoopa Valley Tribe's Water Quality Control Plan, the Hoopa Valley Tribe's Fisheries Implementation Plan, and the Inter-Tribal Fisheries Reintroduction Plan, which violates the Commission's own regulations on tribal consultation and NEPA.

Response: Our review of Commission's files show that none of the four indicated plans have been filed with the Commission for consideration as comprehensive plans, pursuant to section 10(a)(2) of the FPA. However, we discuss the California recovery strategy for California coho salmon (Cal Fish & Game, 2004b) in section 3.3.5.1.2, *Coho Salmon*, the Hoopa Valley Tribe's Water Quality Control Plan (Hoopa TEPA, 2006), as appropriate, in section 3.3.2.1.1, *Water Quality*, and the Intertribal Reintroduction Plan (Huntington, et al., 2006) in section 3.3.3.2.5, *Anadromous Fish Restoration*, of this EIS.

G-51 Comment: Oregon Fish & Wildlife (pp. 32 and 33) comments that the draft EIS Staff Alternative is only partly consistent with the Klamath River Basin Fisheries Restoration Act (Public Law 99-552) to promote access to blocked area habitat to support increased run sizes, and the objective of Interior's Long Range Plan for the Klamath River Basin Conservation Area Fishery Restoration Program to rectify habitat problems including anadromous fish "access above Iron Gate and Copco Dams to the Upper Klamath Basin." Furthermore, the draft EIS does not analyze whether the relicensed project would be consistent with the 1993 FWS Recovery Plan for Lost River and shortnose suckers, the 1994 Northwest Forest Plan (USDA Forest Service and the Bureau of Land Management), the Action Plan for Fisheries Resources and Aquatic Ecosystems (FWS, 1994), or Fisheries USA (FWS, undated).

Response: Our interpretation of whether an action alternative would be consistent with the long range plan for the Klamath River Basin Conservation Area fishery restoration program, an approved comprehensive plan developed in response to the Klamath River Basin Fisheries Restoration Act, is that if the alternative includes measures that facilitate passage of anadromous fish upstream of Iron Gate and Copco dams, it would be consistent with the plan. All action alternatives identified in the draft EIS would achieve this objective. The Northwest Forest Plan, also an approved comprehensive plan, pertains to measures intended to manage habitat for late-successional old-growth forest related species within the range of the northern spotted owl. As we indicate on page 5-82 of the draft EIS, no conflicts with this plan were found with the Staff Alternative. Fisheries USA is also an approved comprehensive plan, and seeks to promote actions that would enhance recreational fisheries throughout the United States. Therefore, any action alternative that enhances habitat for sport fish and angler access to waters of the United States would be consistent with this plan. All action alternatives analyzed in the draft EIS would be consistent with this plan. The 1993 FWS Recovery Plan for Lost River and shortnose suckers is not a Commission-approved comprehensive plan. However, we discuss the plan in section 3.3.5.1.1, and evaluate consistency of potential licensing actions in section 3.3.5.2.3, *Lost River and Shortnose Suckers*, of this EIS.

G-52 Comment: The Forest Service (p. 2) comments that, in the draft EIS, we failed to analyze the effect of any alternative for consistency with the goals of the comprehensive plans listed in section 5.5. The two pertinent National Forest Land and Resource Management plans are listed; but it is unclear whether and if important management goals such as those related to the Aquatic Conservation Strategy would be met.

Response: The Aquatic Conservation Strategy, which is part of the Northwest Forest Plan, has the objective of guiding management actions to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within Forest Service and the Bureau of Land Management-administered lands within the range of the northern spotted owl. Management actions that maintain the existing condition or lead to improved conditions at a watershed or landscape scale in the long term would meet the intent of the Aquatic Conservation Strategy. The Staff Alternative includes measures that would accomplish the following: (1) provide passage for resident and anadromous fish; (2) increase minimum flows and reduce ramping rates in project reaches; (3) establish protocols for releasing hypolimnetic cool water from project reservoirs if conditions for anadromous fish downstream of Iron Gate dam reach critical levels; (4) implementation of measures to enhance DO in the Klamath River downstream of Iron Gate dam; and (5) implementation of additional measures to enhance project-related water quality and fish disease issues within a specified timeframe in accordance with our recommended integrated fish passage and disease management program and comprehensive water quality management plan. These measures would lead to improved conditions at a watershed level in the long term. The Staff Alternative is therefore consistent with the objectives of the Northwest Forest Plan and the Aquatic Conservation Strategy.

G-53 Comment: In section 5.5 of the draft EIS, we state that the Staff Alternative is consistent with the 68 state and federal comprehensive plans that apply to the Klamath River Basin. The Hoopa Valley Tribe (pp. 31 and 32) and Klamath Tribes (p. 10) question whether a blanket assertion of consistency with no summary of what the comprehensive plans require or how consistency is achieved, is sufficient to adequately inform the public or the Commission. The tribes also question whether the Staff Alternative is in fact consistent with many of the plans identified, including the various state and tribal water quality control plans.

Response: It is not practical to provide a summary of each of the 68 Commission-approved comprehensive plans listed in the draft EIS and how consistency was achieved for each of them. Many of the comprehensive plans listed in the EIS document are not plans *per se*, but are reports of activities, some of them more than 20 years old, and, while having a geographical link to the relicensing proceeding,

they do not provide management direction for resources in the project area. The majority of the plans listed call for maintaining or improving the existing conditions of natural resources and recreational opportunities in the region. Based on our review and analysis, we conclude that the Staff Alternative described in this EIS would be consistent with the plans. The Staff Alternative would not diminish and in most cases would enhance water quality, riparian habitat, populations of fish and wildlife, or recreational resources beyond current conditions, which is our analytical baseline.

G-54 Comment: Interior (p. 79), commenting on pages xxxvii, 3-389, lines 7-12, and 5-91, line 6, of the draft EIS, states that the 11-mile segment of the upper Klamath River in Oregon was designated a Wild and Scenic River under section 2(a) (ii) of the Wild and Scenic Rivers Act. The Secretary of Interior (rather than Congress) approved inclusion of the river segment in the Wild and Scenic River system after a petition from the Governor of Oregon. The 11-mile segment of the Klamath River was previously designated an Oregon State Scenic Waterway, which under section 2 (a)(ii) permitted the Governor's petition request. The text should be revised to indicate that the river is designated "wild and scenic."

Response: We removed references to Congress in the referenced text in the Summary; section 3.3.6.1.1, *Regional Recreational Setting, Wild and Scenic Rivers*; and section 5.6.7, *Wild and Scenic Rivers Act*. We noted designation by the Secretary of Interior in the latter two sections.

G-55 Comment: Oregon Parks & Rec (p. 1) comments that portions of the Klamath River in Oregon and California have been designated as Wild and Scenic Rivers and our draft EIS seems to refer to the river as if it were two distinct systems. Oregon Parks & Rec states that we should evaluate the effects of the fish passage proposals on the river as a whole and not separate the system at the state line. This approach is important in the case of protecting and enhancing the wild and scenic river Outstanding Remarkable Values (ORVs).

Response: We realize that, although there are two distinct designated Wild and Scenic River segments on the Klamath River (one in the peaking reach and one downstream of Iron Gate dam), restoration of anadromous fish upstream of Iron Gate dam would influence the Outstanding Remarkable Value of anadromous fisheries in the segment downstream of Iron Gate dam, if production of anadromous fish is enhanced by opening up new spawning and rearing habitat. We added text to section 3.3.3.2.5 to reflect this issue.

G-56 Comment: Interior (p. 66) states that the sentence on page xxxvii of the draft EIS "Such a diminishment of boating opportunities would be inconsistent with the designated ORV of whitewater boating." should be deleted because the consistency determination will be provided by the appropriate agency.

Response: We recognize that ultimately, the appropriate agency would make the consistency determination for the two Wild and Scenic River reaches influenced by the project and modified the indicated sentence as follows: "Such a diminishment of boating opportunities could be inconsistent with the designated ORV of whitewater boating." In its preliminary section 7(a) determination for the Upper Klamath wild and scenic river reach, filed with the Commission on January 30, 2007, the Bureau of Land Management concluded that the Staff Alternative would maintain the recreation ORV, but the Bureau of Land Management modified 4(e) conditions (which corresponds to the Staff Alternative with Mandatory Conditions Alternative) and the Retirement of Copco No. 1 and Iron Gate Developments Alternative would diminish the recreation ORV, but not unreasonably so.

G-57 Comment: American Whitewater (p. 5) asks that the EIS clarify that the Wild and Scenic Rivers Act protects whitewater boating on the Klamath River. American Whitewater supports recreational

releases below J.C. Boyle powerhouse so long as the J.C. Boyle dam exists, but does not in any way want to limit dam removal options. River restoration by dam removal would be consistent with the intent of the Act, even if it conflicts with one aspect of one ORV associated with one reach.

Response: We indicate on page 3-389, lines 7-12, of the draft EIS, that whitewater boating is an important outstanding remarkable value for the portion of the peaking reach that is designated as a Wild and Scenic River reach. We note that the Bureau of Land Management, in its preliminary determination (Bureau of Land Management, 2007), found that its modified 4(e) conditions, as well as retirement of Copco No. 1 and Iron Gate developments, would diminish the values for summer whitewater boating and the ability to wade while fishing, but not unreasonably so. We modified section 3.3.6.2.2, *River Recreation*, of the EIS to reflect this new information.

G-58 Comment: Humboldt County (p. 4) comments that the project significantly diminishes the fisheries and recreational ORV of the Klamath River in the Wild and Scenic River designated reach downstream of the project. The EIS should state that fish populations have declined downstream of the project due to water quality problems, which has decreased the opportunity for quality recreational experiences in the designated reach.

Response: As pointed out in a previous comment by Interior, consistency determinations pursuant to the Wild and Scenic Rivers Act would be provided by the appropriate agency. The appropriate agency for the reach downstream of Iron Gate dam is the Forest Service. In its preliminary determination (Forest Service, 2006), the Forest Service found that none of the action alternatives described in the draft EIS would unreasonably diminish the scenic, recreational, fish, or wildlife values present in the area upon its designation as a component of the National Wild and Scenic Rivers System.

G-59 Comment: The Forest Service (p. 13 of preliminary Wild and Scenic River determination) asks that the EIS include more detailed studies on the short-term effects on water quality and aquatic habitat (magnitude, timing, duration, and geographical extent) from reservoir sediment release of our "Retirement of Copco No. 1 and Iron Gate Developments" alternative to inform its final Wild and Scenic River determination.

Response: The feasibility of dam removal and effects from sediment releases are the subject of studies performed by Stillwater Sciences (2004), G&G Associates (2004), Marcus (2003), FWS (2004), and GEC (2006). The most recent report, GEC (2006), reflects an analysis of potential effects of removal of the four lower mainstem project dams on water quality and aquatic habitat, based on site-specific sediment sampling. The results of that study indicate that the primary fine-grained sediment in J.C. Boyle reservoir is sand, and therefore there would not likely be substantive effects on downstream water quality or habitat associated with removal of this dam. The small size of Copco No. 2 reservoir would also not have a substantial bearing on downstream conditions with its removal. Therefore, the focus of GEC's analysis was on water quality and habitat effects related to removal of Copco No. 1 and Iron Gate reservoirs. We include information from GEC (2006), as appropriate, in our assessments of water quality and aquatic habitat effects associated with two- and four-dam removal alternatives in sections 3.3.2.2.2 and 3.3.3.2.4 of this EIS.

G-60 Comment: The Forest Service (p. 13 of preliminary Wild and Scenic River determination) requests we include in our EIS measures that include analysis of costs and benefits of mitigating the short-term effects from sediment impacts of dam removal, including adjusting the timing of the sediment release to minimize the effects on the aquatic ecosystem or removing and disposing of sediments at uphill sites.

Response: Adjusting the timing of sediment releases to minimize the effects on downstream aquatic ecosystems, by using a staged approach to removal of Iron Gate dam, could be effective, as we indicate

on page 5-58, lines 6-10, of the draft EIS. We assumed in this approach that any upstream dams to be removed would be removed prior to the removal of Iron Gate dam. The costs of implementing such a staged approach would be built into the overall cost of dam removal, and would not likely result in a substantial incremental cost over the cost of removing Iron Gate dam in one continuous process. In our evaluation of the four-dam removal scenario presented in section 3.3.3.2.4 of this EIS, we evaluate a two phased approach, in which the upper three dams are removed in the first phase (and adult anadromous fish are transported and released upstream of Iron Gate dam), and a second phase in which Iron Gate dam is removed several years later. This approach should allow much of the sediment that is transported from the J.C. Boyle, Copco No. 1 and Copco No. 2 reservoirs to settle in Iron Gate reservoir before it is removed, reducing the volume that would be transported into the Klamath River below Iron Gate dam. We conclude that adverse effects downstream of the project would be relatively short-term in nature, and removal and disposal of sediment at uphill sites would not be warranted and the associated costs, which would be substantial even if the sediment is not contaminated, not justified. We have therefore not estimated the cost of removing clean sediments prior to dam removal to prevent its downstream transport and point out that dredging associated with any such proactive sediment removal would result in resuspension of fine-grained sediments which would likely be transported downstream even with implementation of Best Management Practices. Although deposition of silt could limit the spawning success of fall Chinook salmon for several years, population effects would be limited because (1) a large proportion of the stock spawns in tributaries that would not be affected; (2) many of the fish that currently spawn in the mainstem would likely continue upstream and spawn in areas upstream of the Iron Gate dam site; and (3) the effects from 1 or 2 years of poor spawning conditions would be tempered by the species varied life history, with many fish returning after 2, 3, and 4 years in the ocean. Additionally, storage in Upper Klamath Lake could be used to provide a flushing flow to remove fine sediments from spawning areas downstream of Iron Gate dam.

G-61 Comment: Humboldt County (p. 3) disagrees with our conclusion in section 5.6.2 of the draft EIS that relicensing the project would not affect resources within the coastal zone boundary. The EIS "…should state that populations of the listed species of anadromous fish in the coastal zone are significantly impacted by the project, especially in the estuary due to the serious water quality problems created in part by the project." Therefore, Humboldt County concludes that the project is inconsistent with the Coastal Zone Management Act. Friends of Del Norte (pp. 1-5) states that the draft EIS is completely lacking in an analysis that addresses Coastal Zone Management Act consistency issues and incorrectly states in section 5.6.2 that coastal resources, which includes the most downstream 5 miles of the river, are not affected. They state that the Commission chose to ignore the California Coastal Commission's request to confer regarding Coastal Zone Management Act issues, without sound basis. Friends of Del Norte comment that the profound negative effects that the project dams have on anadromous fish throughout the river does ultimately affect the populations of fish in the Coastal Zone, because anadromous fish in this zone come from upstream. They further state that project dams: block fish passage, thus reducing fish populations throughout the basin including the lower 5 miles of the river; limit overall sediment transport downstream, including the lower 5 miles of the river and coastal deposition processes; limit the quantity of water transported to the lower 5 miles of the river; degrade downstream water quality, resulting in massive fish kills; exacerbate pathogen production that are toxic to downstream fish; and are largely responsible for the cumulative effect of unsustainable and weak populations of anadromous fish which has resulted in cessation of coastal fisheries causing great regional economic hardship. They state that text in various portions of the draft EIS contradicts our conclusion that the coastal zone is not affected by the proposed relicensing of the project.

Response: We consider the need for a determination of consistency with appropriate coastal zone policies to be primarily a matter to be determined by the state and the applicant. In this instance, PacifiCorp concludes that relicensing the project would not influence the designated coastal zone. In its July 22, 2004, letter to the Commission, R. Merrill, the North Coast District Manager of the California

Coastal Commission, states: "We are reviewing whether FERC's proposed licensing of the continued operation of PacifiCorp's Klamath Hydroelectric Project would require Commission (meaning the California Coastal Commission) review of a federal consistency certification pursuant to the CZMA." On page 67 of SD2, we state that if the California Coastal Commission makes a determination that PacifiCorp should file an application for consistency with the policies of the Coastal Zone Program, we would address this program in section 5.6 of the EIS. We have not yet received the results of that review. If the state should determine that PacifiCorp should file a request for determination of consistency, it should notify PacifiCorp accordingly, and keep us informed of any such requests. However, we have modified the text of section 5.6.2 to reflect the fact that it is ultimately up to the state to determine whether relicensing the project would be consistent with applicable coastal zone policies, and indicate the current status of the state's review of the need for a consistency determination.

GEOLOGY AND SOILS

Affected Environment

GS-1 Comment: PacifiCorp (p. 3-1) states that the EIS is incorrect on page 3-6, lines 16-17, where it states that the Klamath River is non-alluvial and sediment supply-limited all the way to its mouth, particularly in the lower river below about the confluence with the Shasta River.

Response: We concur that to apply this statement to the mouth is incorrect. We have refined this sentence in section 3.3.1.1.2 of this EIS.

GS-2 Comment: Interior (p. 68) and NMFS (p. 50) comment that it is incorrect for the draft EIS (on page 3-17, lines 1-5) to state that "[M]ost channel banks in the study area are composed of bedrock, boulders, and cobble, and thus only subject to minor erosion." These agencies claim that substantial percentages of the project area channel and banks are composed of alluvium, and larger percentages of the streambed have or had an alluvial component. These agencies also state that all but the steepest reaches of rapids would have included seasonal gravel/cobble deposits in and around boulders where fish and invertebrate production would have occurred, and that this is presented in PacifiCorp's Water Resources Technical Report. The agencies note that there is also significant alluvial bank erosion occurring during peaking operations.

Response: We agree that this section appears to overstate the percentage of bank composed of bedrock, boulders and cobble, and we modified the text of this EIS accordingly. However, as we note in the draft EIS, there are substantial sections of the river's edge that are either bedrock, or were formed by colluvial processes (i.e., landslides and rockfalls), and the cobble and boulders comprising these areas are colluvial, not alluvial, in origin. We discuss the issue of bank erosion during peaking operations in the draft EIS in sections 3.3.1.2.1, *Shoreline Erosion*, and 3.3.9.2.1, *Effects of Project Operations on Cultural Resources*.

GS-3 Comment: PacifiCorp (p. 3-31) states that the earthflow on the left bank near Bogus Creek mentioned on page 3-18, lines 31-37, is not project-related.

Response: We concur. We have made explicit in section 3.3.1.1.3 of this EIS that this source of sediment is not project-related. This comment does not cause us to change our conclusions.

GS-4 Comment: Interior (p. 68) and NMFS (p. 50) disagree with our text on page 3-23, lines 35-37, of the draft EIS, and comment that base flows are also important in establishment of riparian vegetation.

Response: We modified section 3.3.1.1.4 of this EIS to make clear the role of base flows in the establishment of riparian vegetation. This comment does not cause us to change our conclusions.

GS-5 Comment: PacifiCorp (p. 3-1) states that it is true that no systematic survey of seed dispersal was conducted to determine dispersal dates (page 3-26, lines 7-9, and page 3-51, lines 4-7). However, based on the observations made by PacifiCorp's botanists during a field survey in 2002, it was apparent that coyote willow fruits were green (seeds not ready for dispersal) during April but appeared to be approaching maturity (Terrestrial Resources FTR p. 3-107). Brinkman (1974) cited in the FTR indicates that *Salix exigua* seed disperse in June-July (when yellow). PacifiCorp's use of May-June as the dispersal period is consistent with the period used for the Hell's Canyon Project on the Snake River (Braatne et al., 2002) reported by Uchytil (1989, as cited in Braatne et al., 2002).

Response: We maintain that acknowledging the uncertainty regarding seed dispersal dates is important because if most seed dispersal occurs earlier or later than May or early June, willow recruitment could be different than that identified in PacifiCorp's Terrestrial Resources FTR and Water Resources FTR. Further, the Snake River is substantially north of the Klamath River, and as such, dates from that region may be inappropriate for application to the region along the Oregon/California state line. This comment does not cause us to change our conclusions.

GS-6 Comment: PacifiCorp (p. 3-1) comments on text from page 3-26, lines 18-19, of the draft EIS, that the Link River does not have substantial alluvial deposits and has high coverage of bedrock in the channel. It states that, under existing operations, however, the combination of instream flow and seepage along the banks supports a very dense riparian zone along much of the Link River.

Response: The intent of the section cited by PacifiCorp is to describe the relationship between substrate and flows (i.e., some of the key aspects of riparian recruitment that are covered by geomorphology), not to provide documentation of riparian conditions along the reach. Although there may be dense riparian vegetation along much of the river, substantial additional recruitment is limited by the substrate. This comment does not cause us to change our conclusions.

GS-7 Comment: Interior (p. 68) and NMFS (p. 50) comment on page 3-26, lines 31-33, of the draft EIS, that it is unrealistic to combine generalizations on the bypassed reach and the peaking reach into one conclusion because the hydrologic patterns affecting the geomorphology in these two reaches are significantly different. They comment this is shown by the extreme differences in the duration of bed mobilizing flows with and without project, as documented in table 3-6, and alluvial portions of the reach are affected by channel-forming processes and this *is* strongly linked to riparian vegetation. They find the connections between geomorphology and riparian vegetation are inadequately addressed in the draft EIS and should be fully explained in a supplemental draft EIS. These connections can be found in the post-hearing brief and in the ALJ's decision.

Response: On page 3-25, lines 29 and 30, of the draft EIS, we note that the "Geomorphic characteristics vary considerably throughout the J.C. Boyle bypassed and peaking reaches." What we note to be similar between the two reaches is the fact that riparian vegetation does not appear to have a strong influence on the formation and persistence of bedforms (i.e., large woody debris is not forcing any channel features; and riparian vegetation, via its roughness and flow constricting abilities, is not forming channel or bedforms). We recognize the interconnectedness of riparian vegetation and geomorphology in riverine landscapes; however, it is not clear that riparian vegetation—regardless of any potential effects of the project on its recruitment or growth—is a strong forcing agent of channel dynamics on the project-affected reaches of the Klamath River. As the agencies note, the duration and magnitude of channel-forming flows appears more important than vegetation in terms of forming and maintaining the channel of the river in the J.C. Boyle bypassed and peaking reaches.

GS-8 Comment: PacifiCorp (p. 3-1) comments on page 3-28, lines 4-9, of the draft EIS, that the visit to the "Osburger" site was conducted at the request of Redding District Bureau of Land Management staff, who raised concerns regarding erosion at the site and possible links to project operations.
Response: We have included this information in section 3.3.1.2.1 of this EIS. This comment does not cause us to change our conclusions.

Bedload Transport and Sediment Budget

GS-9 Comment: Interior (pp. 10, 11, 68, and 69), Oregon Fish & Wildlife (pp. 57-58), and NMFS (pp. 17, 50, and 51) state that the geomorphological conclusions on pages 3-22 and 3-23 of the draft EIS were based on inadequate sediment transport information. For example, they state the gravel tracer study produced both under- and overestimates because PacifiCorp selected gravel study sites in the steepest part of the J.C. Boyle bypassed reach and in the flattest part of the peaking reach. These sites were not representative of either reach, and result in interpretations of project effects that are unfounded. These comments also apply to table 3-4. The EIS should clarify the errors, assumptions, and recognized biases identified in the PacifiCorp sediment budget data upon which the staff recommendations were based.

Response: The referenced pages and table pertain to the affected environment section of the geology and soils section, where we present available information pertaining to sediment transport. Although we used the empirical sediment transport information (i.e., tracer gravel) from the Water Resources FTR in our analysis, we too are aware of the limitations of the data and methods employed by PacifiCorp. We note specific issues related to these limitations on pages 3-38 and 3-39 of the draft EIS. Further, the information in table 3-4 of the draft EIS was modified by staff to emphasize the uncertainty of transport related to tracers that were not found at the time of resurvey. Our analysis is based on available information in the record. We added additional text in section 3.3.1 of the EIS regarding the limitations of PacifiCorp's geomorphology studies. Although we consider it important to understand the limitations of the studies when using them to reach our conclusions, we do not consider it to be productive to include a full critique of the studies in our EIS.

GS-10 Comment: PacifiCorp (p. 3-1) comments page 3-35, lines 25-26, of the draft EIS, that while project operations reduced the frequency of bed mobilizing events from roughly an annual or semiannual basis to about two times less frequent, it should be noted that this change is primarily driven by coarsening of the bed and the subsequent increase in flow required to mobilize the bed.

Response: We noted this likelihood in the draft EIS on page 3-38, lines 4-8.

GS-11 Comment: Interior (p. 10-11; p. 69) and NMFS (p. 17; p. 50) comment that generally, and specific to draft EIS tables 3-5 and 3-6; page 3-35, lines 16-33; and page 3-38, lines 1-8, there were improbabilities with PacifiCorp's with- and without-project flows for threshold of mobility that question the interpretation of project effects on bed mobilization and ultimately on the sediment budget.

Response: We are aware of the limitations of the data and methods employed by PacifiCorp. We note specific issues related to these limitations on pages 3-38 and 3-39 of the draft EIS. Further, in the draft EIS we modified some of PacifiCorp's assumptions in the sediment budget so as to increase the accuracy of this modeling tool and remove some of the biases and errors that we identified.

GS-12 Comment: PacifiCorp notes that we adjusted the sediment budget to reduce the yield for Cottonwood Creek from 450 tons/mi^2/yr to 170 tons/mi^2/yr (a reduction of 72 percent), and applied a "low" connectivity factor to the yield for Cottonwood Creek (an additional 75 percent reduction) (see page 3-42, lines 23-42, of the draft EIS). PacifiCorp disagrees with our decision to revert back to the low volcanic terrain yield and to apply the low connectivity factor, as this effectively assumes that

Cottonwood Creek has a lower yield than many of the creeks upstream that are in the low-yield volcanics. PacifiCorp suggests at the very least averaging the 170 tons/ mi^2/yr and 450 tons/ mi^2/yr yields for Cottonwood Creek.

Response: We determined the connectivity factor for Cottonwood Creek consistent with PacifiCorp's stated methods, and in concert with the conditions we observed in the field (low slope, upstream depositional zones, and depositional zones near the creek mouth). Furthermore, written evidence on the record indicates that Cottonwood Creek was mined for gravel for construction of Interstate 5, and our field observations of Cottonwood Creek (from the headwater reaches to the Klamath River) found it to have, at most, a moderate sediment supply compared to other nearby tributaries. The highly eroded grade control structures in the entrenched channel of Cottonwood Creek, visible just upstream of the Copco Road bridge crossing, also indicate that the stream appears to be supply-limited. As such, our basis for determining this sediment yield is derived from field observations, not from map-based observations such as PacifiCorp used for upstream tributaries. We see little scientific or empirical basis for using an average of the PacifiCorp and staff-derived value. This comment does not cause us to change our conclusions.

GS-13 Comment: PacifiCorp (p. 3-2 to 3-3) notes that we adjusted the sediment budget to reduce the Shasta River sediment yield from 450 tons/ mi^2/yr to 15 tons/mi^2/yr based on information in Buer (1981) (see draft EIS, p. 3-45, lines 1-11). PacifiCorp maintains that we erred in computing the sediment yield and suggests that we clarify this calculation because it significantly alters the transition from sediment deficit to surplus. PacifiCorp provides the following calculations in support of its position:

5,000 yd^3/yr * 1.485 tons/yd^3 = 7,425 tons/yr

7425 tons/yr / 99.29 mi^2 = 74.8 tons/mi^2/yr

Response: Although PacifiCorp has accurately displayed the units and the arithmetic for converting the information from Buer (1981), one important value is incorrect: the area of the Shasta River watershed is 792.85 square miles (as per the PacifiCorp sediment budget spreadsheets, submitted in response to our AIRs), not 99.29 square miles. Cottonwood Creek, located in the spreadsheet on the line above the Shasta River, has a watershed area of 99.29 square miles. Therefore, when 792.85 is substituted for 99.29 in the calculations shown in PacifiCorp's comment above, the final value is 9.36, which we rounded to "~10 tons/mi^2/yr", as stated in the draft EIS, p. 3-45, line 8. We conservatively chose to use 15 tons/mi^2/yr in the sediment budget. This comment does not cause us to change either our base data used in our analysis or our conclusions.

GS-14 Comment: PacifiCorp (p. 3-3) notes that we adjusted the sediment budget to reduce yields for tributaries from Shasta River to Scott River from 450 tons/mi^2/yr to 170 tons/mi^2/yr—an incremental increase of 50 tons/mi^2/yr for each tributary downstream (see draft EIS, p. 3-45, lines 12-18). This is also a significant change. Similar to the previous comment, PacifiCorp suggests that staff consider starting at a higher yield than 170 tons/mi^2/yr (which reflects the low-yield terrain upstream) and then increase incrementally to the 747 tons/mi^2/yr they use for the Scott River.

Response: As we describe in the draft EIS (p. 3-45, lines 12-18), we have found more reasonable sediment yields than the sediment yields used by PacifiCorp for this reach of river. The approach we have taken provides an incremental increase from the Shasta River to the Scott River. Further, the value for the Scott River is based on the results of two detailed studies that examined the sediment yield of the Scott River. We consider these data and the approach we use appropriate for the purposes of our assessment. This comment does not cause us to change our conclusions.

GS-15 Comment: PacifiCorp (p. 3-3) notes that, because we partly based our recommendation of the downstream extent of the APE on PacifiCorp's revised sediment budget calculations (p. 3-45, lines 34-44, and 3-46, lines 1-15, of the draft EIS), a closer evaluation of the sediment budget based on PacifiCorp's comments above should be conducted before finalizing the APE. Without such re-evaluation, the extent of the APE should extend no further than the transition from sediment deficit to sediment surplus as shown in our adjusted sediment budget (i.e., at Vesa Creek near RM 164.3).

Response: We note in the draft EIS that although the sediment budget results indicate a transition from sediment deficit to sediment surplus somewhere near Vesa Creek (RM 164.3), there is ample evidence that the sediment budget is probably not accurate enough to base the APE determination (as related to a sediment deficit) on the sediment budget alone. As such, we provide other analysis and suggest that almost certainly by the Scott River the Klamath River transitions to surplus. This comment does not cause us to change our conclusions.

GS-16 Comment: PacifiCorp (p. 3-4) comments that we suggest that the deficit for fine sediments is nine times greater than the deficit for coarse bedload (see draft EIS, p. 3-51, lines 16-17). It states this is misleading in that the percentage reduction should remain the same as the percentage reduction for coarse sediment and, therefore, because there is more fine sediment, this total volume is increased.

Response: The overall percentage reduction in sediment for both finer sediment and coarser bedload sediment is the same. In the draft EIS, we simply note that the quantity (not the percentage) of fine sediment reduction is about nine times greater than that of bedload sediment. This is consistent with PacifiCorp's assumption that bedload sediment represents about 10 percent of the total sediment load. This comment does not cause us to change our conclusions.

GS-17 Comment: PacifiCorp (p. 3-3), commenting on pages 3-46, lines 16-29, and 3-47, lines 1-20, of the draft EIS, states that it documented very limited alluvial features from Iron Gate dam (RM 190) downstream to about RM 181 (which is just downstream of Cottonwood Creek). Alluvial features then increase from RM 181 to a peak near RM 172 and remain relatively constant to RM 158 (downstream of Beaver Creek) before dropping to a low at RM 152 and then rising rapidly through the Scott River confluence. PacifiCorp's analysis does not support extending the APE beyond Cottonwood Creek.

Response: We reviewed PacifiCorp's information in the Water Resources FTR; however, other factors (such as valley configuration, slope, and the results of the sediment budget, as we note in previous comment responses) lead us to support extending the APE downstream of Cottonwood Creek. This comment does not cause us to change our conclusions.

GS-18 Comment: PacifiCorp (p. 3-3) comments that we note the effects of sediment starvation from upstream project dams have not helped the river recover from effects of in-channel mining and floodplain grading (see draft EIS, p. 3-47, lines 19-20). However, it is not clear that a much higher sediment supply would result in recovery from a legacy of in-channel mining and floodplain-grading effects.

Response: We agree. However, it was our intention to portray the fact that sediment starvation was an adverse effect related to recovery of the channel from in-channel mining. We make this clarification in section 3.3.1.2.3 of this EIS. This comment does not cause us to change our conclusions.

GS-19 Comment: Interior (p. 69) and NMFS (p. 51) comment that on pages 3-38, lines 21-22, and 3-39, lines 1-10, of the draft EIS, we state that the PacifiCorp data was used for our analysis because there were no other data to propose an alteration in project operations to enhance geomorphologic processes. They note this is not an acceptable justification in light of the problems found in the tracer studies, and disregards industry standard practices of evaluating parameter sensitivity in any model output.

Response: We consider it appropriate to point out the uncertainties associated with PacifiCorp's estimations of the discharge necessary to achieve the threshold of bed mobility, as we did in the indicated text of the draft EIS. Correcting the deficiencies in the indicated studies could take years of additional field study with little assurance that resource agencies or others would agree on the results of such studies. We prefer to focus our emphasis on measures that pertain to sediment management to address identified project-related habitat needs and our analysis reflects this approach. This comment does not cause us to change our conclusions.

GS-20 Comment: Interior (p. 4) and NMFS (p. 11) comment that there are several reasons why the threshold of mobility modeling results should be considered as having a wide range of error around them. They note the analysis should reflect the uncertainty associated with the 1,700 cfs flow at which the bed is mobilized, and further note that evidence suggests that 1,700 cfs underestimates the threshold of mobility in this system.

Response: We recognize the reasons why the threshold of mobility modeling results may be uncertain; however, our analysis is limited to those data that exist in the record. Furthermore, we have integrated these uncertainties into our assessment of the results of the sediment budget model and other conclusions of PacifiCorp's studies. This comment does not cause us to change our conclusions.

GS-21 Comment: Interior (p. 69) and NMFS (p. 51) comment on text on page 3-35, lines 22-23, stating "PacifiCorp calculated the frequency of bed mobility … table 3-6 shows these results." This statement should be changed to "…calculated the *duration* of bed mobilizing flows," because the table shows what percent of the entire record they occur. "Frequency" refers to the return interval shown in table 3-5.

Response: The data presented in the EIS are based directly upon those provided by PacifiCorp in the Water Resources final technical report (PacifiCorp, 2004f). Because this analysis was conducted using mean daily flow data (from 1968 to 2001), it is characterizing the frequency of bed mobility in a general way, without enough resolution to determine the actual duration of flows exceeding the threshold of mobility (i.e., the duration as measured in hours). The agencies are suggesting we interpret the data to infer that if, for example, 30 percent of mean flows exceed the threshold of mobility, then the threshold is exceeded for 30 percent of the entire period of record. However, because fluctuations in flow (flows being both above and below the threshold) during a single day can average to a discharge at or above the threshold, we note that assuming that frequency of flows above can equal duration could over (or under) estimate the length of time that flows are actually above the threshold. We appreciate the perspective of the agencies in this regard, but choose to characterize the data in table 3-6 as PacifiCorp did in the Water Resources FTR. This comment does not cause us to change our conclusions.

Seasonal High Flow Events

GS-22 Comment: PacifiCorp (p. 3-1) comments that on page 3-39, lines 20-26, of the draft EIS, we indicate that the agency-recommended seasonal high flow measure would result in annual spills at J.C. Boyle dam of at least 3,300 cfs, producing a "threefold increase in the frequency of 3,330 cfs flows or greater in the J.C. Boyle bypassed reach." This is not entirely correct. PacifiCorp comments that the EIS correctly indicates that spills exceeded 3,300 cfs in 5 years between 1990 and 2005 (about once every 3 years). However, during the same period of years, inflows would have been available to implement the agency-recommended seasonal high flow measure in 8 years (a frequency of about once every 2 years), not annually. Interior (p. 2) and NMFS (p. 7) comment that the Bureau of Land Management's preliminary prescription for a seasonal high flow is misrepresented in the draft EIS. It is not prescribed annually but rather, is triggered by an inflow to the J.C. Boyle reservoir of more than 3,300 cfs. Interior and NMFS state that their analysis of the hydrologic record for the J.C. Boyle stream gage (USGS gage #

11510700) demonstrates that the seasonal high flow would have been implemented, on average, in 51 percent of the years between 1960 and 2004.

Response: We agree that we misinterpreted the wording of the Bureau of Land Management's measure, which states that at a minimum, at least once annually between February 1 and April 15, PacifiCorp should not divert water to the J.C. Boyle powerhouse when inflow to the reservoir exceeds 3,300 cfs, to mean that the expectation was that seasonal high flow events would occur once a year. We now recognize that this was not the intent of the measure and the flow trigger was meant to define the years during which such seasonal high flow releases would occur. We revised this section of the draft EIS, including clarification of the recommended measure based on the Bureau of Land Management's modified terms and conditions and further consideration of information provided by various entities.

GS-23 Comment: Interior (p. 1-11 and 95), Cal Fish & Game (p. 5), and NMFS (p. 7-15) comment that we do not adequately analyze the diversion of 3,300 cfs from the J.C. Boyle bypassed reach nor the expected results of implementing agency prescriptions for a flow-triggered seasonal high flow event lasting 1 week, stating the analysis relied extensively on PacifiCorp studies that are either flawed or have enough uncertainty that they are unreliable for forming reasonable conclusions. They point out that in draft EIS section 5.2.1, we focused on only one (flushing of fine silt) of the factors considered in the purpose and need for bed-mobilizing flows in the bypassed reaches. These agencies state that the mitigating effects of the proposed seasonal high flows include control of reed canarygrass, creation of long-term riparian maintenance flows, alluvial feature formation, and creation of channel complexity. Interior and NMFS comment the draft EIS fails to describe the link between the seasonal high flow prescriptions, the gravel management plan, and the relative benefits to all of the flow and sediment impacted resources. Without further consideration of additional information provided by the resource agencies and others during this proceeding, they state that the draft EIS does not provide adequate analysis from which reasonable conclusions can be made.

Response: The agencies' recommended seasonal high flows would have effects beyond the flushing of fine sediment, and on page 3-39 of the draft EIS, we identified other beneficial effects (notably, scour of invasive vegetation and benefits to the recruitment of native riparian vegetation). We revised section 5.2.1 of this EIS, including clarification of the recommended measure based on the Bureau of Land Management's modified terms and conditions and further consideration of information provided by various entities and now include this measure in the Staff Alternative.

GS-24 Comment: Interior (p. 70) and NMFS (p. 51) comment that there is a lack of information about the abundance of reed canarygrass in the J.C. Boyle bypassed and peaking reaches. Reed canarygrass in the reaches has had significant effects on the riparian community; however, these impacts are not addressed in the draft EIS on pages 3-51 to 3-52. Interior and NMFS point to the post-hearing brief and ALJ's decision concerning the impacts caused by the project in promoting reed canarygrass in the bypassed and peaking reaches, and ask staff to present and discuss the information in the EIS.

Response: In the draft EIS, we limited our discussion of fluvial geomorphic effects on riparian vegetation to available information. We have integrated additional information from the EPAct proceeding, as pertinent, into section 3.3.1.2.4 of this EIS.

GS-25 Comment: Interior (p. 96) requests that we consider the following finding of the ALJ and the underlying data and analysis behind the finding when revising the draft EIS on pages 5-19 to 5-20: "Seasonal high flows, in combination with the Bureau of Land Management's proposed gravel augmentation program, will likely create a more dynamic channel with a wider range of sediment deposits. This sediment will be deposited higher on the channel margin which will serve as an ecological benefit".

Response: This finding is in agreement with our analysis that acknowledged the role of the agencies' proposed seasonal high flows in the scour of invasive vegetation and the recruitment of native riparian vegetation.

GS-26 Comment: Interior (p. 2-3) and NMFS (p. 11-15) state that our conclusion in the draft EIS that the existing average spill duration and quantity is sufficient to flush fine-grained sediment during many years (p. 5-19, lines 22-23) is inconsistent with the initial flushing flow conclusion (that agency recommendations for a flushing flow could help to ensure that spawning areas used by trout remain sufficiently free of silt). Interior (p. 4) indicates that we relied on table 3-18 for our analysis of adequacy of spill magnitude, which provides average spill rates by month, but this provides little insight into the actual frequency and magnitude of high flow events. Interior (p. 95) comments that the EIS should compare frequency, duration, and timing of high flows under existing or proposed flows with what would occur under the Bureau of Land Management's specified flow. These comparisons were made in Interior's filing of preliminary prescriptions and mandatory conditions and should be included in revising the draft EIS.

Response: Table 3-5 of the draft EIS provides the flow at the threshold of mobility for with- and without-project conditions and includes the approximate return interval of those discharge levels. In this table, the return intervals for different study reaches of the J.C. Boyle bypassed reach range from 0.6 to 1.7 years under with-project conditions and 0.6 to 1.0 in the without-project conditions. Table 3-6 shows the frequency, both with- and without-project, when flows exceeded the threshold of mobility for the 1968 to 2001 period of record used by PacifiCorp. Table 3-18 of the draft EIS provided a summary of the spillage at J.C. Boyle and other dams for the shorter period of record available from PacifiCorp on spillage (1990 to 2004), but this table was not the sole basis of our analysis of the frequency and magnitude of high flow events in the J.C. Boyle bypassed reach. We added more text and a new figure in section 3.3.1.2.3, *Project Effects on Sediment Transport*, to help analyze the Bureau of Land Management's specified flow for the J.C. Boyle bypassed reach.

GS-27 Comment: Conservation Groups (pp. 19 and 20) state that, even though the draft EIS acknowledges that seasonal high flow events recommended by agencies could help to ensure that spawning areas used by trout remain sufficiently free of silt to support both egg incubation and trout recruitment, we dismiss these flows based on cost. They comment that this dismissal does not account for other benefits of a seasonal high flow release specified in the ALJ decision, including creation of redband trout spawning habitat and improved redband trout migration, which would overcome negative effects associated with redd scouring. The EIS should reconsider our dismissal based on the ALJ decision.

Response: In our draft EIS, we did not reject implementation of seasonal high flows based solely on their cost. We concluded that flows sufficient to flush fine particles from spawning gravel already occur during many years when spillage occurs. As indicated in the previous comment response, we conducted additional analysis in section 3.3.1.2.3, *Project Effects on Sediment Transport*, based on our current understanding of the seasonal high flow measure offered by the agencies, and it is evident that, during some years, seasonal high flows would provide beneficial effects in the J.C. Boyle bypassed reach. We now conclude that implementing this measure would be considerably less costly than originally estimated, and we therefore include it in the Staff Alternative.

GS-28 Comment: Interior (p. 4) and Oregon Fish & Wildlife (p. 53) state that draft EIS table 3-6 (p. 3-37) shows that, in the bypassed reach, the duration of mobilizing flows has been reduced by the project to a much greater degree than in other project reaches. They note the duration of flows above 1,700 cfs occurs between 28 and 100 percent of the time without the project and between just 2 and 16 percent of the time with the project. Therefore, to lump the effectiveness of the duration of mobilizing flows in

the bypassed reach with the other reaches does not recognize the unique hydrologic situation in the bypassed reach.

Response: We note that threshold of mobility analysis at "the blowout" study site (where analysis found that the threshold of mobility was exceeded 100 percent of the time) is anomalous, and in our opinion, is related to the unnatural sediment input from the emergency spillway. Given that outlier, the difference in the frequency of occurrence of flows necessary to flush fine sediment from spawning gravel for with- and without-project conditions in the J.C. Boyle bypassed reach is similar to that for other project reaches. This comment does not cause us to change our conclusions.

Sediment Management

GS-29 Comment: PacifiCorp (p. 3-2) comments on page 3-40, lines 1-2, of the draft EIS, that we interpret its sediment augmentation as a one-time measure. However, PacifiCorp's proposed sediment augmentation measures actually call for recurring placement. PacifiCorp notes that the volume and frequencies of recurring sediment augmentation would be based on monitoring of the initial gravel placements. An assessment of bed mobilizing flow recurrence intervals suggests that recurrence of sediment augmentation may have to occur about every 3 years.

Response: We modified the indicated text of the EIS to reflect this clarification, as well as the cost of the proposed measure to reflect a recurrence interval of once every 3 years, rather than a one-time occurrence.

GS-30 Comment: PacifiCorp (pp. 3-2, 3-3, 5-2, and 5-3) comments that it is important to note that it reached a stipulated agreement with the Bureau of Land Management on gravel augmentation in the J.C. Boyle reaches in preparation for the EPAct proceeding. The stipulated agreement reflects an adaptive approach to determine the character, locations, and amounts of sediment to be placed in the J.C. Boyle reaches. The plan calls for placing sediment in the J.C. Boyle reaches in quantities targeted at 1,226 tons/year minimum and 6,134 tons/year maximum, but would be subject to evaluation depending on the inter-annual flow variability of the Klamath River, factors related to the extent of sediment mobilization and downstream transport, and other considerations. The stipulated agreement also adopts the Bureau of Land Management's condition that augmented sediment not be limited to spawnable gravels, but also include a range of sediment particle sizes intended to address the Bureau of Land Management's objectives for "channel complexity."

Response: We consider any stipulations agreed to by PacifiCorp and agencies with mandatory conditioning authority to be directed at the content of any revised conditions rather than a modification of PacifiCorp's original proposed measure. We reviewed and analyzed the Bureau of Land Management's modified 4(e) condition as it pertains to sediment augmentation and revised sections 3.3.1.2 and 5.2.1 of the EIS accordingly.

GS-31 Comment: Interior (pp. 8, 10, and 11), Oregon Fish & Wildlife (p. 61), and NMFS (pp. 16-17) comment that the draft EIS (p. 5-20, lines 7-9) fails to analyze the full scope of intended benefits of the Bureau of Land Management's River Gravel Management Plan, which was supported by the findings of fact from the ALJ decision. They state that an adequate effects analysis would include the impacts on the river system from the lack of sediment due to project dams and reservoirs, and an assessment of the effects of augmentation. The ALJ determined that the Bureau of Land Management's proposed gravel augmentation program, combined with the seasonal high flow, would likely create a more dynamic channel with a wider range of sediment deposits. Interior and NMFS find that the staff did not adequately analyze the effects on riparian and fish habitat from the trapping of sediment due to project dams. Further, they comment that the analysis of the expected results of implementing the Bureau's prescription of sediment augmentation was lacking and focused on only one (increasing of spawning habitat) of the

many factors considered in the purpose for sediment augmentation. The Bureau's River Gravel Management Plan also was intended to improve the quality of riparian habitat and increase stream channel complexity, and Interior and NMFS ask that these aspects be evaluated.

Response: We revised our discussion in section 5.2.1 of this EIS to integrate the other factors considered in the purpose for sediment augmentation. We have made more explicit the connection between sediment augmentation and seasonal high flows that may benefit channel complexity, native riparian function, and rainbow trout spawning and rearing habitat.

GS-32 Comment: Interior (pp. 8 and 69) and NMFS (pp. 16, 17, and 51), commenting on page 3-40, lines 3-19, of the draft EIS, state that the Bureau of Land Management's specified sediment augmentation measure makes rough minimum estimates based on information available from PacifiCorp. The condition reserves to the Bureau of Land Management the specification of augmentation quantity and grain sizes that would provide for a wide range of management objectives. Finer sized material would be needed for establishment of desirable riparian vegetation. Based on monitoring information, the Bureau of Land Management would determine the necessary sediment augmentation quantity and grain sizes to meet a multitude of management objectives, including a quantity sufficient to restore deficits from more than 50 years of cumulative sediment retention. Monitoring information is likely to show that larger amounts of sediment (larger than the rough minimum estimates) would be necessary to overcome the large current sediment deficit and meet the Bureau's multiple objectives. The EIS should assess the need for an increased maximum quantity of sediment in light of new information provided by Dr. Cluer in his testimony during the EPAct hearings.

Response: In section 3.3.1.2.3 of this EIS, we clarify that the caliber of sediment (as well as the volume and frequency of augmentation) are adaptable aspects of the plan. Although exact plan goals would be determined during plan development, we specifically acknowledge that it would include consideration of the needs of riparian vegetation. This is one of the reasons why an element of the plan is to map surfaces suitable for riparian vegetation recruitment. We also indicate that the plan could consider channel complexity and would not preclude examination of other project-related habitat factors. We agree that large amounts of sediment would be necessary to return the rivers geomorphological processes to pre-project conditions, but point out that we do not agree with this ultimate goal. Our focus is on enhancing habitat that is known to be affected by project operations. These revisions have not caused us to change our conclusions.

GS-33 Comment: Interior (p. 9), Oregon Fish & Wildlife (pp. 63-64; pp. 68-69), and NMFS (p. 16-17) comment that the draft EIS does not clearly describe why 100 to 200 cubic yards of gravel for the J.C. Boyle bypassed reach is recommended by the staff or proposed by PacifiCorp, how these quantities were determined, or the relevance to physical setting and processes. They note the Staff Alternative is to develop a gravel augmentation plan based on mapping and monitoring, but the analysis of costs based on a quantity of gravel that is not justified is inadequate.

Response: We adopt PacifiCorp's proposed quantity of gravel for augmentation because it seems a reasonable starting-point assumption for generating a cost estimate. The volume used for cost estimation should not be construed as representing the amount of gravel that we recommend during augmentation, which we recommend be determined based on mapping and habitat needs. However, by using relatively low volume for our cost estimate, we do not artificially inflate the cost of implementing this measure to a point where the costs may appear to not be worth the benefit. This approach of using an admittedly relatively low volume avoids having consulted parties conclude that substantially higher volumes are endorsed in our recommendation. We conclude that there is currently no basis to accurately predict the volume of sediment that would be necessary for each augmentation event. We concur that future gravel augmentation costs (where augmentation volumes would be based on mapping and monitoring) may

differ based on adaptive management. However, as we discuss in the draft EIS, during some years it may not be necessary to augment sediment (i.e., following a dry year), and in other years more sediment may be necessary. As such, we averaged this variability and assumed 10 annual placements at the PacifiCorp prescribed volumes. The agencies' comments do not cause us to change our conclusion.

GS-34 Comment: Interior (p. 10), commenting on page 5-21, lines 9-11, of the draft EIS, states that our recommended gravel augmentation measure specifies no minimum or maximum amounts of sediment associated with its implementation, thus the assumption that 10 annual placements would be sufficient is arbitrary. Interior suggests that we calculate the amount of channel capable of retaining sediment, and as stated by staff, "surfaces suitable for riparian recruitment," and base cost estimates on these quantities. Interior suggests we use the estimate of the area of the bypassed reach capable of retaining sediment made by Cluer during his EPAct testimony. Cluer calculated that 36 percent of the reach would retain sediment, and that the quantity needed to "fill" those areas would be about 26,600 cubic yards. NMFS (p. 17), referring to the text in the draft EIS that states that our recommended measure includes "mapping existing spawning gravel deposits and alluvial surfaces suitable for riparian recruitment and, based on the results of that mapping, developing sediment augmentation volumes, locations, and sizes that meet plan goals." However, NMFS states that it is not clear what "plans" are being referenced. Therefore, NMFS states it is impossible to tell whether the intent is to provide gravel for a specific number of redds or for an area of the stream channel.

Response: As we indicate in the previous response, the cost estimates for sediment augmentation in the draft EIS are not arbitrary. No minimum or maximum is stated because the adaptive management approach allows for variations based on the preceding water year type, amount of gravel surveyed, and plan goals. Although Cluer's estimates of potential space within the reach capable of "holding sediment" may be valid, using that maximum quantity of potential sediment storage as the basis upon which to estimate costs seems unreasonable given the fact that placement of such a volume is largely infeasible in any one year, because that large volume would not be needed on an annual basis, and because the specific resource goals that the plan is likely to include do not require augmentation at that level to achieve substantial improvement. The plan discussed in NMFS' comment is the augmentation plan we discuss on draft EIS page 5-20, lines 43-48. The plan, which would developed in consultation with the agencies and filed with the Commission, would determine specific monitoring metrics: e.g., if gravel area would be quantified by fixed spatial extent of the channel, or some other metric such as space for a minimum number of redds. Interior's and NMFS's comments do not cause us to change our conclusion.

GS-35 Comment: NMFS (p. 17) states that the assumptions and calculations behind the numbers provided in the draft EIS on page 5-21, should be provided. It is not clear if these numbers are based on the assumption that gravel in each of the 10 injections is deposited in the same place each time.

Response: Because sediment augmentation for a river is physically limited by locations where a truck or loader can place the material in the channel (and that location must also be favorable in terms of hydraulics), the number of locations is inherently limited. We examined these locations for the Klamath River, and assumed that all injections of sediment over time would be made at the same locations. All costs described in draft EIS section 5.2.1 are the product of Commission staff working with regional and site-specific costs for material procurement, hauling, planning, and surveying. Because the professionals making these cost estimates also practice the type of work for which the estimates are being made, we are confident in these estimates, and in the use of professional opinion to fill assumptions, when required.

GS-36 Comment: Cal Fish & Game (p. 6) comments that the Staff Alternative gravel management plan (which encompasses the reaches below J.C. Boyle and Iron Gate dams) also should be applied to the reach below Copco No. 2 dam, and gravel management in this reach should not be contingent on restoration of anadromous fish, but should instead begin with issuance of a new license and expand in

response to changes in the fish community. Interior states (p. 7-8) that the conclusion in the draft EIS that habitat in the Copco No. 2 bypassed reach would not support a quality trout fishery (draft EIS, p. 5-19, lines 34-42) is not substantiated by the facts in the record. Similar to the analysis for the J.C. Boyle bypassed reach, Interior comments the draft EIS appears to disregard the other purposes and benefits that would occur by restoring a flood flow regime capable of mobilizing the channel bed. Rather than compartmentalizing the effects of a single mitigating measure acting alone, Interior asks that our analysis consider the cumulative benefits of the entire suite of proposed measures. It states that these measures, including increased base flows, gravel augmentation, and seasonal high flows, act together to mitigate for effects on project water quality and habitat and should be recognized in the staff's alternatives analysis.

Response: We maintain that the potential for restoring a naturally reproducing population of rainbow trout in the Copco No. 2 bypassed reach is limited by the lack of coldwater refugia within or adjacent to the reach. The nearest substantive coldwater refugia downstream of the reach are in Jenny and Fall Creeks, but much of the formerly accessible habitat in these creeks has been inundated by Iron Gate reservoir. The remaining accessible area is limited to less than 1 stream mile by the presence of impassible falls in both creeks. In the upstream direction, trout would need to migrate over Copco No. 2 and Copco No.1 dams to access Long Pine, Shovel, or Negro creeks. Although it is plausible that trout residing in the Copco No. 2 bypassed reach could locate and migrate into Fall Creek, competition for the limited coldwater habitat in Fall Creek could become substantial if it is used by non-migratory resident trout and as a temperature refugium by trout that rear in Iron Gate reservoir and in the Copco No. 2 bypassed reach. We note, however, that the integrated fish passage and disease management program would include the immediate restoration of upstream passage to all project reaches via trap and haul, and monitoring of this phase would be used to identify if additional measures are needed to support anadromous fish restoration, which could include passage measures, gravel augmentation, and the adjustment of minimum flows, if warranted, in the Copco No. 2 bypassed reach**.**

GS-37 Comment: Interior (p. 70) and NMFS (p. 51), commenting on page 3-42, line 5, of the draft EIS, note that one of the major project-related sediment barriers is J.C. Boyle dam. PacifiCorp recommends that we revise the sentence on page 3-42, line 5, of the draft EIS to read: "PacifiCorp is unaware of any project-related sediment barriers *to fish passage* in the Klamath River."

Response: There appears to be a discrepancy between the draft EIS and the comment from Interior and NMFS. In the draft EIS, on page 3-42, lines 5-10, we are discussing the recommendation from Siskiyou County related to fish passage barriers *caused by sediment*, not barriers to the movement of sediment. We are not aware of any fish passage barriers in the Klamath River caused by sediment, project-related or otherwise. We revised the text in section 3.3.1.2.3, of this EIS, to make this more clear. This revision has not caused us to change our conclusions.

GS-38 Comment: Interior asks for clarification of text on page 3-58, line 32, of the draft EIS. Interior requests we define the terms "minor" and "short term" when we refer to unavoidable adverse effects associated with erosion and sedimentation where project-related earth disturbing activities are recommended.

Response: The definition of these relative terms would vary depending on the specific site where earth disturbing activities occur, as would the Best Management Practices needed to control erosion and sedimentation. Earth disturbing activities associated with installing a boat ramp may last for several days whereas earth disturbing activities associated with installing a new downstream fish passage facility could last for weeks, if not longer. Relative to an ongoing or long-term effect that lasts for years, we consider these variable timeframes to be short term. In all cases, the technology exists to minimize erosion and sedimentation, which is why we characterize the effect as minor.

GS-39 Comment: Interior (pp. 70 and 97) and NMFS (pp. 4, 59 and 66) comment that the draft EIS (on pp. 3-54 to 3-57; 3-292; and 5-58) concludes that released sediments associated with removal would have potential adverse effects. The California State Coastal Conservancy has sponsored recent studies (GEC, 2006) of project reservoir sediments that indicate that the toxicity of the reservoir sediments is very low and would not affect the method or cost of any dam decommissioning. Accordingly, Interior asks us to revise the analysis in the EIS to reflect this information.

Response: We revised our analysis in section 3.3.3.2.4 and 5.2.21 of the EIS to reflect the information contained in the California State Coastal Conservancy-sponsored studies (GEC, 2006). However, we continue to conclude that released sediment associated with dam removal would have potential for adverse effects, although as we state on page 5-58, lines 6-21, of the draft EIS, these effects could be minimized with careful planning. We know of no technology that currently exists that could eliminate any adverse effects of sediment releases if any mainstem dams should be removed. We also note that on page 6 of GEC (2006), they state that the report "…provides an overview, but not a comprehensive analysis of dam removal and its effects on water quality. Much additional analysis will be required to fully evaluate dam removal as a preferred project management alternative." Thus the GEC study should be considered preliminary, and not a definitive affirmation that dam removal would be benign.

Slope and Channel Restoration at the J.C. Boyle Bypassed Reach

GS-40 Comment: Interior (pp. 11 and 69) and NMFS (p. 19) concur with the analysis and conclusion reached in the draft EIS (p. 5-22, lines 31-33 and 39-41) that restoration of the J.C. Boyle bypassed reach spillway erosional area is imperative. However, they ask for additional analysis and details regarding the actions proposed for restoration of the slope to clarify the impacts of the Staff Alternative. Specifically, the analysis should include long-term impacts of the proposed hillslope restoration on the known spawning areas directly below the spillway—i.e., they note the eventual loss of this source of fine and coarse sediment to the bypassed reach was not addressed. These agencies state that the EIS should address the impacts on existing spawning habitat and any mitigation proposed for its eventual decline or loss, and include relevant ALJ findings. Interior also questions how PacifiCorp would restore the emergency spillway slope failure and states that PacifiCorp cannot be allowed to just remove this slope from the project boundary and leave it to the Bureau of Land Management to restore.

Response: We do not directly address the reduction of fine and coarse sediment below the emergency spillway realized by restoration of that erosion area for two reasons. First, the sediment management plan that we recommend would set goals for spawning gravel, riparian recruitment areas, and channel complexity in the reach, and any such goals would inherently examine changes in the channel at the spillway erosion site. Second, although the fine and coarse sediment entering the river channel at the spillway erosion site does function as a sediment source, it is an anthropogenic source of sediment that enters the stream with little correlation to seasonality of other sediment inputs and the discharge within the channel. Hence, the loss of sediment entering the channel via an anthropogenic source (at the channel at the spillway erosion site) is offset by anthropogenic sediment augmentation via the sediment management plan. Given the comprehensive monitoring elements and performance measures of the specified sediment management plan, we conclude that there is a low probability of any long-term adverse effects of reduced sediment supply to the channel at the spillway erosion site. The specific methods for restoring the emergency spillway slope failure would be based on detailed consideration of site-specific conditions and established during development of the restoration plan, and would be reviewed and approved by the agencies and Commission. On page 5-6 of the draft EIS, in recommended measure 2S and discussed further on page 5-56, lines 14-22, we clearly state that the right bank of this bypassed reach should remain in the project boundary of any new license to ensure Commission oversight of restoration and protection measures and to ensure continued stability of the intake canal and project access road. The agencies' comments do not cause us to change our conclusions.

GS-41 Comment: Interior (p. 11), Oregon Fish & Wildlife (p. 73), and NMFS (p. 19) comment that the draft EIS (p. 3-29, lines 34-35) needs to clarify whether the synchronized bypass valve proposed by PacifiCorp would entirely eliminate or simply minimize spill events when a unit trips offline, because whether or not spill is actually eliminated or not will have a significant bearing on the cost, design, and resource impacts of slope rehabilitation.

Response: On page 3-29 of the draft EIS, we characterize the proposed measure as PacifiCorp characterizes it in it license application. On page 3-32, lines 20-32 of our analysis of this measure, in the draft EIS, we indicate our expectation that this proposed measure would eliminate discharge of eroded sediment downslope of the emergency spillway. Our recommendation to restore this slope to eliminate the ongoing erosion that is occurring would be implemented under the assumption that the bypass valve would be effective. We removed references to minimizing use of the emergency spillway in sections 3.3.1.2.2 and 5.2.2 of the EIS, to clarify our expectation.

GS-42 Comment: Interior (p. 69) states that the paragraph in the draft EIS on page 3-31, lines 29-37, does not disclose any effects from eliminating the required development of standard operating procedures that would specifically address emergency spillway and canal and slope failures.

Response: The specific paragraph that Interior comments on is one of many in that subsection of the draft EIS that introduces the recommended measures of the agencies and applicant. We analyze this measure on page 3-32, lines 37-45, of the draft EIS, and discuss the importance of establishing proactive protocols that would be followed in the event of unforeseen canal and slope failures on page 5-23, lines 17-30, and recommend development of such protocols in staff measure 3S.

GS-43 Comment: PacifiCorp (p. 3-38) disagrees with the conclusion that the constriction shown in figure 3-79 of the draft EIS blocks gravel movement, as we indicate on page 3-272, lines 36-38, of the draft EIS. The large pool upstream of the constriction in this figure acts to trap gravel thereby stopping its downstream movement. PacifiCorp states that removing sidecast material would not substantially diminish the size or depth of the pool, which appears to be largely a naturally created feature.

Response: PacifiCorp's comment offers a refinement of our statement regarding how downstream gravel transport is likely impeded—i.e., the pool impedes the transport, not the sidecast material. We maintain that the project-related sidecast material has altered the floodplain and channel morphology, causing an overall constriction of the river. This is evident from our review of historic (1952) and recent (2000) aerial photographs. In section 3.3.3.2.2 of this EIS we refine our discussion to explain that, while the pool itself is what may capture sediment, the sidecast material that forms the pool has altered the channel and floodplain morphology, constricts channel conveyance, and hence forms and enhances the effects of the pool on sediment transport. However, we have reconsidered our initial recommendation in this EIS based on the cost of additional measures that we now include in the Staff Alternative, the high cost of implementing this measure, and the environmental benefits associated with implementing this measure. We now conclude that the Staff Alternative would contain sufficient monitoring of sediment deposition from our recommended augmentation program and the habitat response to sediment augmentation (i.e., salmonid spawning and riparian vegetation development) that initial removal of sidecast material is not warranted, but could still be implement if monitoring results indicate that the barrier formed by the sidecast material is impeding the habitat goals of the sediment augmentation plan and fish passage plan.

GS-44 Comment: PacifiCorp (p. 5-3) notes that the intake canal failure that occurred in December 2005 was the result of a rock fall that originated outside the project boundary and caused a large boulder to puncture the canal wall and release water to the adjacent slope. It comments the failure did not result from a landslide resulting from project-induced development or steep, unstable slopes as implied by the text on page 5-22, lines 41-45, of the draft EIS, but rather the erosion caused by this canal failure was

remediated and the slope was stabilized as part of the canal repair. According to PacifiCorp, additional slope restoration is not necessary to address the effects of the December 2005 canal failure, especially because it states that slope failure was not the cause of the event.

Response: We conclude that the construction of the canal and access road has over-steepened sections of the hillslope above and below the canal and roadway. The same vertical drop still occurs, yet the road and canal occupy a portion of the lateral distance, thus increasing the steepness of these slopes. On page 5-23, lines 17-20, of the draft EIS, we note that this situation makes the canal, roadway, and adjacent fillslope vulnerable to unforeseen natural and project operational events that can cause sudden releases of large quantities of water, resulting in erosion of material in the bypassed reach. We have determined it is necessary to restore the bypassed reach to the extent feasible by removing eroded material that has originated from project-related slope failures, as recommended in the Staff Alternative. See our response to the previous comment.

Riparian Vegetation and Geomorphological Processes

GS-45 Comment: PacifiCorp (p. 3-4), commenting on page 3-51, lines 26-27, of the draft EIS, notes that we indicate that sidecast material has "constricted the channel and has altered the riparian vegetation along much of the reach." PacifiCorp states the constriction caused by the sidecast material is limited to one location about 4,800 feet upstream of the emergency spillway, and upstream from this point, a longer section of sidecast material occurs along the right bank. The type of riparian vegetation historically growing along this section of sidecast bank was always limited by the steep and rocky topography. Historic aerial photography for this area indicates that talus interspersed with patches of upland shrubs dominated this steep slope. Cottonwood is not, and likely has never been, a common riparian species in the J.C. Boyle bypassed reach. The channel morphology, even in the wider portions of the bypassed reach, would not allow for development of large cottonwood stands. Sycamore was not detected in any of the botanical surveys in this or any other reach of the study area. In addition, PacifiCorp notes the project area is well outside of the natural range for sycamore.

Response: We revised the text in section 3.3.1.2.5 of this EIS to reference "woody riparian vegetation" instead of mentioning specific tree types.

GS-46 Comment: PacifiCorp (pp. 3-4) comments that the draft EIS section on fluvial geomorphic effects on riparian vegetation mentions tribal concerns about potential project impacts on riparian willow growth downstream of Iron Gate dam (e.g., at Ishi Pishi Falls) (page 3-50, lines 7-14). PacifiCorp notes the area that the tribes are concerned with is far downstream of Iron Gate dam (more than 100 miles) where direct project effects are likely overwhelmed by influences from downstream tributary flows and sediment loads. PacifiCorp states the altered hydrograph and peak flow events during the spring that may affect willows are not related to project operations.

Response: Our mention of tribal concerns about potential project effects on riparian willow growth at Ishi Pishi Falls characterizes a comment made by the California Indian Basketweavers Association and does not reflect our analysis or conclusions. We recognize the facts stated in PacifiCorp's comment; however, we have not altered the way we characterized the issue and concern of the California Indian Basketweavers Association.

GS-47 Comment: PacifiCorp (p. 3-5) comments that, downstream of Iron Gate dam, the distribution of riparian vegetation is strongly influenced by flows. PacifiCorp agrees that its tree age analysis in the Iron Gate to Shasta reach does have some limitations for interpreting the origin and timing of willow regeneration. This analysis, however, serves to emphasize with site-specific data that an uncommon sequence of flow events is needed to favor willow reproduction. Willow establishment, whether from

seed or by vegetative means, requires bare surfaces with the right flow conditions to allow reproduction to occur. As a result of the NMFS 2002 BiOp for Reclamation's Klamath Irrigation Project, PacifiCorp's project operations have little control over these flows. PacifiCorp disagrees with the conclusion that project effects on sediment supply contribute substantially to cumulative effects on riparian vegetation downstream of Iron Gate dam (see draft EIS, p. 3-53, lines 10-13). Although sediment is retained by Iron Gate dam, the effects are likely limited to a relatively short distance below Iron Gate dam before they are overwhelmed by the relative contribution from downstream sediment sources.

Response: PacifiCorp's comments are generally consistent with our conclusion that its project operations reduce the availability of sediment that, in concert with flow alterations resulting from the NMFS 2002 BiOp for Reclamation's Klamath Irrigation Project and cumulatively affect riparian vegetation downstream of Iron Gate dam. Inconsistent in this comment is the notion that a unique sequence of flow events is the sole factor in favorable willow reproduction, when in fact flow, substrate, and other factors are required. As we describe in more detail in our responses to PacifiCorp's comments regarding the sediment budget downstream of Iron Gate dam, we disagree that the project effects on downstream sediment are overwhelmed by other factors a short distance downstream of Iron Gate dam. We note that we do not use the phrase "contributes substantially to cumulative effects on riparian vegetation downstream of Iron Gate dam"; we state: "…we conclude that project effects on sediment supply may be combining with the Klamath River's altered flow regime downstream of Iron Gate dam (dictated primarily by the NUFS 2002 BiOp for Reclamation's Klamath Irrigation Project) and other factors to cumulatively affect riparian vegetation." This comment does not cause us to change our conclusions.

GS-48 Comment: PacifiCorp (p. 3-4) comments that the sample size for its study was not "0.48 per river mile" as indicated in the draft EIS on page 3-52, footnote 33. It states that the study area for the Wetland Riparian Study included the reach below Iron Gate dam from the dam to the mouth of the Shasta River (RMs 176.8 to 188.9), a distance of 12.1 miles. PacifiCorp notes the number of tree samples was 2.4 trees per river mile which is still a low sample size unless one considers the fact that sampling was conducted in areas with hydrologic modeling and stands of coyote willow growing on alluvial deposits.

Response: There is inconsistent information stated in the Terrestrial Resources FTR (which includes the survey range discussed above), and the Water Resources FTR (table 6.7-7, riparian tree age summary), which indicates that trees were surveyed at least as far downstream as the Scott River. Further, the Water Resources FTR indicates that "An additional analysis related to geomorphology and riparian vegetation was conducted to investigate anecdotal evidence of cobble/gravel bar fossilization by willows between Iron Gate dam *and Seiad Valley* [emphasis ours] and the potential impact of the Project on this phenomenon." This led to our inclusion of the entire reach to Seiad Valley. Despite information in the Water Resources FTR apparently being stated for areas beyond the range of survey, we modified the footnote in section 3.3.1.2.5 of this EIS to acknowledge the range stated in the Terrestrial Resources FTR.

GS-49 Comment: PacifiCorp (pp. 3-5), commenting on lines 20-22, on page 3-53, of the draft EIS, acknowledges that the Terrestrial Resources FTR states that "It may be that the general scarcity of finer sediment moving through the river is limiting the ability of large flows to deposit fresh sediment into the floodplain at least upstream of Cottonwood Creek." However, PacifiCorp notes this was a general statement on the part of its riparian vegetation specialists about sediment deposition on floodplains in overall project reaches upstream of Cottonwood Creek. Evidence from PacifiCorp's geomorphic site survey data for fine sediment is contrary to our suggestion that the bars may be too coarse for effective riparian recruitment. PacifiCorp notes the pebble count data presented in PacifiCorp's Water Resources FTR gives no indication that the reach from Cottonwood Creek to Scott River lacks sufficient fine sediment for effective riparian recruitment. In fact, even the gravel bars are relatively fine here: 49 mm at the upstream end down to 25 mm at the downstream end. Also, PacifiCorp states data presented in

appendix A of the FTR show fine silts and organics mixed with gravel and cobble, including areas of extensive willow growth immediately adjacent to the low flow channel.

Response: Although we follow the line of logic in PacifiCorp's comment, we note that there are other factors (most notably conclusions of the sediment budget as we discuss in previous comment responses) that also contribute to riparian recruitment conditions not accounted for by PacifiCorp's comment. These comments do not cause us to change our conclusion that the project exerts a cumulative effect on riparian recruitment downstream of Iron Gate dam because it limits the amount of sediment available for downstream transport.

WATER QUANTITY

WQ-1 Comment: As clarification of page 3-59, line 22, of the draft EIS, PacifiCorp (p. 3-6) suggests that we change the words "operated by PacifiCorp" to "owned by Reclamation and operated by PacifiCorp under Reclamation management directive."

Response: We made this change in this EIS.

WQ-2 Comment: As clarification of page 3-63, lines 4-15, of the draft EIS, Interior (p. 70) states that there are only about 150,000 irrigated agricultural acres within the Reclamation's Klamath Irrigation Project that are served by Upper Klamath Lake and the Klamath River.

Response: We made this change in this EIS.

WQ-3 Comment: KWUA (p. 9) indicates that the draft EIS suggests that the minimum elevation of Upper Klamath Lake prior to its modification and construction of Link River dam was 4,140.0 feet and that the elevation varied by about 3 feet. KWUA is aware of information indicating different values that may be important in other proceedings, but not critical to this relicensing decision. KWUA requests that we make it clear in the EIS that the statements are simply taken from whatever specific sources were relied upon, rather than being the product of our independent analysis.

Response: We state on page 3-1 of the draft EIS that, unless otherwise indicated, the source of our information is the license application. Such is the case with our reporting of the elevation of the bedrock ledge at the outlet of Upper Klamath Lake prior to its removal in 1921 (page 3-59 of the draft EIS). We are aware of various elevation datums for Upper Klamath Lake that have been used by other entities. The elevation variance of about 3 feet prior to construction of Link River dam stated on page 3-164 of the draft EIS is from page 99 of NAS (2004), as cited in the draft EIS.

WQ-4 Comment: Interior notes that on page 3-63 of our draft EIS we state that the "net use of irrigation project water is 2.0 acre-feet per acre" including the national wildlife refuges. Interior is unclear about our source for this information, since the net annual use of water for the Klamath Irrigation Project is about 1.25 acre-feet per acre. In comparison, the gross diversion for the Klamath Irrigation Project is on the order of slightly more than 2.5 acre-feet per acre.

Response: On page 3-1 of the draft EIS we indicate, that unless otherwise stated, the source of our information is the license application for the project, which includes the various final technical reports that were appended to the application. In this instance, page 5-15 of the Water Resources Final Technical Report states that about 200,000 acres of cropland were irrigated by the Klamath Irrigation Project in 1999 and on the following page, up to 400,000 acre-feet is used for irrigation and refuge operations associated with the Klamath Irrigation Project in an average year. We divided the volume of water used for irrigation by the acres of cropland irrigated to derive our 2.0 acre-feet per acre value. This value is

consistent with the value reported in Reclamation (2000) "Klamath Project Historic Operation." On page 6 of Reclamation's document is the following: "During a normal year, the net use on the Project is approximately 2.0 acre-feet per acre including the water used by the U.S. Fish and Wildlife Service in the Tule Lake and Lower Klamath National Wildlife Refuges." However, in light of this comment, we revised this EIS accordingly in section 3.3.2.1.1 to correspond to the more recent information from Reclamation/Interior. This change does not alter our conclusions in the EIS.

WQ-5 Comment: KWUA (p. 2) states that our summary of Klamath Irrigation Project operations on page 3-64 of the draft EIS should be modified to reflect that diversions of Klamath River water occur from the Lost River diversion channel during the principal irrigation season, and water levels in this channel are affected by Keno reservoir elevations. In addition, there is winter irrigation in parts of the irrigation project, most notably lands in the lower Klamath area such as Klamath Drainage District, and diversion for this use is also dependent on Keno reservoir elevations.

Response: On page 3-68 of the draft EIS we state that PacifiCorp operates Keno dam to allow the consistent operation of irrigation canals and pumps. Figure 3-6 illustrates the diversions from Keno reservoir to the Lost River diversion channel as well as Ady and North canals during the primary irrigation season (July) compared to March. However, for added clarity, we added minor text additions similar to the suggestions made by KWUA to this EIS in section 3.3.2.2 on page 3-68. It does not change our conclusions.

WQ-6 Comment: KWUA (pp. 2-5) states that, although the draft EIS attempts to describe Keno dam and reservoir and their operation in a variety of places (e.g., pages 2-5, 2-15, 2-17, 3-68, 3-131 to 3-133, 3-232, 4-10 to 4-19, and 5-55), it finds these discussions deficient for the following reasons: (1) although it is correct to state that there is a 1968 contract between Reclamation and PacifiCorp pertaining to operation of Keno dam, we should note that this contract has not expired and remains in effect; (2) a more complete history of river regulation at Keno should be provided that points out that prior to the 1930s, water levels at Keno were controlled by a natural reef and irrigators upstream of the reef had established diversions and means to protect their land from flooding, but PacifiCorp's predecessor eliminated the natural reef control, replacing it with a dam; and (3) our analysis of Keno dam, which concludes that Keno does not contribute to downstream generation, is directly refuted by various accounts that indicate that PacifiCorp was allowed to regulate flow at Keno but was also required to ensure water levels for irrigation diversion and provide flood control (KWUA asks why PacifiCorp would build a dam if it did not contribute to generation).

Response: We added text in section 2.1.1.2, *Keno Development*, to clearly state that the contract has not expired and remains in effect. The major discussion of the history of river regulation at Keno is located in section 3.3.1.1.3, *Klamath River Geomorphology*, in the draft EIS and addresses the issues raised by KWUA in (2) above. Our analysis of Keno reservoir shows that Keno is managed to normally remain within a 0.2 foot operational band and fluctuations within this band are normally the result of changes in inflow, rather than attempts to enhance downstream hydroelectric operations. Although at one time Keno dam served project purposes, which is why it was included in the existing license, our analysis in section 4.7 of the draft EIS shows that it no longer serves those project purposes.

WQ-7 Comment: KWUA (p. 5) disagrees with our recommendation on page 5-55 of the draft EIS to maintain a minimum surface elevation of 4,085.0 feet from May 1 through October 15 if Keno development remains in the project. It states this specified period is insufficient because the main irrigation season begins sooner and ends later and this time period does not recognize that there is substantial diversion of water from Keno reservoir during winter months for irrigation of Klamath Irrigation Project lands. The 1968 contract that is still in effect calls for maintenance of water levels whenever water is being diverted for use in the Klamath Irrigation Project. The draft EIS provides no

analysis of why it would be appropriate to deviate from historic operating levels that have been developed in the experience and operation of Keno dam and the relevant diversions and irrigated lands. KWUA comments that our draft EIS provides only a partial description of current water level management and no evaluation of the regime's importance.

Response: Our review of figure 3-7 in the draft EIS, which summarizes Keno reservoir elevations from 1990 through 2004, leads us to conclude that our recommendation to maintain the water surface elevation at or above elevation 4,085.0 feet from May 1 through October 15 is consistent with historic operating levels, as we state on page 3-131, lines 41-43, of the draft EIS. There are no instances where Keno reservoir levels decrease below elevation 4,085.0 feet from May through mid-October, but from mid-October through April, occasional drawdowns of the reservoir occur. As we state on page 3-131, lines 39-41, the occasional drawdowns outside the May through mid-October timeframe are reportedly to allow irrigators to clean out their water withdrawal systems before the irrigation season. Our intent in specifying the Keno reservation elevation timeframe is to accommodate Keno reservoir irrigators and enable these occasional drawdowns to occur without violating the conditions of a new license. However, we conclude that provisions for appropriate notification of all water users of Keno reservoir water, as well as resource and land management agencies and the Commission, before any scheduled drawdowns occur could be incorporated into a project operation and resource management plan, if Keno development remains within a new license. Consequently, we revised our recommendation in section 5.2.19 to correspond to Reclamation's preliminary and modified 4(e) conditions to maintain the Keno water level at or above the minimum normal operating elevation of 4,085.0 feet (Reclamation datum) throughout the year if Keno development remains in the project.

WQ-8 Comment: Interior (p. 15) states the EIS should recognize that 12,244 acre-feet is an estimate of the current active storage capacity of the project reservoirs assuming normal operations (draft EIS, page 5-34, lines 12-17). Interior's estimate of active storage for these reservoirs is different from the amount reported in PacifiCorp's documents. USGS has estimated actual active storage in Copco and Iron Gate reservoirs at about 52,000 acre-feet (Campbell and Heasley, pers. comm.). A volume of 52,000 acre-feet would provide about 875.4 cfs per day for a 30 day month (Campbell, pers. comm.). The Water Board (p. 6) states that the EIS should evaluate alternate methods of using stored water in reservoirs for meeting instream flow needs.

Response: As stated in table 3-16 in the draft EIS, 12,244 acre-feet is the volume between the normal maximum and minimum operating water levels. The footnotes of the table indicate an estimated 44,000 acre-feet of storage in Copco and Iron Gate reservoirs between the normal maximum water level and the invert of the penstock intakes. This volume was estimated by using the area-capacity curves provided in the license application for Copco and Iron Gate reservoirs. We slightly adjusted both area-capacity curves based on the total storage volumes shown in table A2.1-1 of the license application to account for the updated total storage volumes derived from recent bathymetric surveys and these adjustments are reflected in the footnote in table 3-16 of the draft EIS.

WQ-9 Comment: On page 3-126, lines 1-8, of our draft EIS, we conclude that the Spencer Creek gage would only be a PacifiCorp responsibility if flows to the J.C. Boyle bypassed reach are based on a percentage of inflow. Interior states (p. 70) that flows in the J.C. Boyle bypassed reach should be based on a percentage of inflow as required by the preliminary 4(e) condition. If flows in the bypassed reach are based on a percentage of inflow, the Spencer Creek gage would be a PacifiCorp responsibility. Cal Fish & Game (p. 7) states that the approach taken in the draft EIS does not acknowledge the probable incorporation of proportional flows based on preliminary mandatory 4(e) conditions and 10(j) recommendations filed by resource agencies into a new license. To ensure project compliance with mandatory flow conditions as well as to provide flexibility for adapting future project operations, the EIS

should include a requirement for installation of gages where needed to appropriately monitor inflow and outflow from each facility.

Response: PacifiCorp should ultimately be responsible for all gages necessary to ensure compliance with the flow regime specified in a new license. Our recommended project operation and management plan would enable gages to be installed to monitor project flows, as needed. On lines 37-39, of page 5-24, of the draft EIS, we state: "We therefore include the development of a project operations and resources management plan that includes provisions for gage installation appropriate to any flow regime specified in a new license in the Staff Alternative." We carefully selected this language to reflect the potential that although we may not agree with the need to measure flows at specific locations, such as Spencer Creek, if it is included as a mandatory condition that is included in a new license, gages would need to be installed and monitored to ensure compliance with the flow regime specified in a new license. Consequently, the approach taken in the draft EIS does acknowledge the probable incorporation of proportional flows specified in mandatory conditions into a new license.

WQ-10 Comment: Page 3-129, lines 23-27, of our draft EIS, states that PacifiCorp monitors, or provides assistance to USGS for monitoring and recording, many hydrologic indicators. Interior (p. 12), NMFS (p. 19), and Oregon Fish & Wildlife (p. 74) comment that there is currently no gage in the J.C. Boyle bypassed reach, and therefore it is not possible for PacifiCorp to monitor compliance with the 9 inch ramp rate in this reach. Oregon Fish & Wildlife (p. 78) recommends that the Staff Alternative contain a Project Operations Management proposal with specific measures, including monitoring and location of new gages. Pacific Coast Federation of Fishermen's Associations et al. (pp. 42 and 43) comment that the draft EIS does not adequately analyze the need for flow gaging and the recommendations of various entities regarding gage locations. It claims that flow monitoring is currently widely acknowledged as inadequate within the project.

Response: We specified the location of new gages that we agree would be needed to measure the flow regime that we recommend in the draft EIS on lines 44-49, of page 5-24, and lines 1-2, of page 5-25, of the draft EIS. We include a new gage in the J.C. Boyle bypassed reach among these recommended new gages. Refer to our response to the previous comment.

WQ-11 Comment: PacifiCorp (p. 3-16) states that gages located in bypassed reaches directly below reservoirs and diversions should be sufficient for monitoring minimum flow and ramping requirements. If there is a need to determine inflows, PacifiCorp considers this best accomplished by monitoring change in reservoir or diversion pool elevation, with bypassed and generation channel flows, and estimating inflows. This could not be done on a real-time basis, requiring time to process the information.

Response: As indicated in our response to the previous comment, we specify the locations where we consider new gage installation to be appropriate to monitor our recommended flow regime in section 5.2.3 of the draft EIS. However, if specific gage locations are specified in mandatory conditions that are included in a new license, our recommended gage locations may need to be adjusted accordingly. We indicate on lines 26-28, of page 5-24, in the draft EIS, that the project operations and resource management plan would be developed in consultation with the resource agencies, including USGS. PacifiCorp would be free to propose alternative flow monitoring methods to those specified in non-mandatory conditions. The alternative monitoring methods may be able to be implemented if concurrence is obtained from the consulted resource agencies and the Commission that the alternative technique would enable the Commission to appropriately monitor and document compliance with the flow regime specified in a new license. Also, refer to our response to Comment WQ-5.

WQ-12 Comment: PacifiCorp (p. 5-3), commenting on section 5.2.3, *Project Operations Management*, in the draft EIS agrees that new gaging would be required in ungaged bypassed reaches for which there is

a minimum flow or ramping requirement. However, PacifiCorp states that telemetry of this data to the appropriate control structure may prove problematic and recommends that monitoring updates be no more frequent than once an hour, because if GOES is required, data transmissions cannot occur more often.

Response: The Bureau of Land Management specifies 30 minute reporting intervals for the gages in the currently ungaged J.C. Boyle bypassed reach, and Oregon Fish & Wildlife recommends 1 hour intervals (similar to PacifiCorp). If it is technologically infeasible to transmit data via the Geostationary Operational Environmental Satellite system or other methods, at intervals less than an hour, PacifiCorp would be able to explain this during the consultation with resource agencies associated with development of the project operations and resource management plan. If ramping rates in a new license are defined as stage change per hour, we do not see the need to transmit stage and associated flows at intervals less than an hour even if the data is recorded at shorter intervals.

WQ-13 Comment: Our recommendation for a project operations management plan (5S on p. 2-47 of the draft EIS) includes a provision for minimizing water level fluctuations at Iron Gate reservoir from March through July to protect breeding wildlife. PacifiCorp (p. 2-5) states that this provision would conflict with our modification of PacifiCorp's proposed water quality management plans to include provisions for consideration of spillage at Iron Gate dam during the spring to warm downstream Klamath River water and spillage at Copco No. 1, Copco No. 2, and Iron Gate dams during the summer to enhance DO released at Iron Gate development (p. 2-45, lines 13-16, of the draft EIS). PacifiCorp states that both of these recommended measures would draw down the water level of Iron Gate reservoir.

Response: We do not view these two recommended elements to be in conflict because if there are reservoir fluctuations associated with controlled spill events, any changes in water surface elevation would occur above the spillway crest elevation. When the spill event concludes, the water surface elevation would return to full pool level. There would be no drawdown of the reservoir associated with any controlled spill. We agree that establishing a range of allowable Iron Gate water level fluctuations in the project operation and resource management plan is appropriate. This would enable achievement of the goal of minimizing effects on wildlife within the constraints of a spill plan to enhance aquatic habitat, and we modified our recommendation in the EIS accordingly.

WQ-14 Comment: Interior (p. 96) states that Reclamation believes there should be more gaging within the project for full disclosure to the public, in real time, of project operations that affect multiple parties.

Response: We agree with Interior's comment. Our recommendations would increase the number of gages within the project area that provide real-time data, as indicated on pages 5-24 and 5-25 of the draft EIS. We include such real-time measures as part of our Staff Alternative in measures 8P and 32P. We also discuss the advantages of providing real time information to the public on page 3-447.

WQ-15 Comment: Interior (p. 96) comments that our statement on page 5-35, lines 14-15, of our draft EIS, that irrigation return flows to Keno reservoir can vary by up to 775 cfs over a 24 hour period and this could result in substantial flow variations downstream of Iron Gate dam (if instantaneous run-of-river operations are implemented) is incorrect. The large daily fluctuations experienced between Link River and Keno dams are due to PacifiCorp's daily peaking operations of the East Side and West Side powerhouses. The large daily fluctuation would no longer occur when those developments go off line. The large daily fluctuations at the USGS Link River gage can be seen in the spreadsheet attached to Interior's comment letter (column G) along with the net change in agricultural diversions (column N).

Response: We agree that daily peaking or cycling of East Side and West Side powerhouses are responsible for part of the variation in the inflow to Keno reservoir. However, as column N shows in the

data submitted by Interior, return flows from the Klamath Irrigation Project can vary by more than 800 cfs per day; this is consistent with information we provide in the draft EIS.

WQ-16 Comment: The city of Yreka (p. 3) comments that if the Cal Fish & Game recommended minimum flow to the Fall Creek bypassed reach, estimated to range from 14 to 22 cfs, is implemented and the Fall Creek Cal Fish & Game holding facility diverts another 6 to 9 cfs, how can the city divert the 15 cfs it is entitled to? How and where will these minimum flow requirements be measured, relative to the city's water right? If additional flow monitoring should be required to confirm that flows are available to meet the city's water right, the city should not have to bear any such related extra costs that might arise from conditions of a new license. Pacific Coast Federation of Fishermen's Associations et al. (pp. 20 and 21) states that it is not clear whether the city of Yreka's municipal water diversion on Fall Creek is dependent on the operation of the Fall Creek development. If so, the potential economic impact to the city of Yreka if any operational changes should make this water supply unavailable should be addressed in the socioeconomic analysis.

Response: Whatever minimum flow is ultimately provided to the Fall Creek bypassed reach would not be for consumptive purposes and therefore should have no bearing on the city's water right or its ability to meet the consumptive needs of its customers. As we note on page 3-77 of the draft EIS, flows in Fall Creek typically range from 30 to 50 cfs without the diverted flow from Spring Creek. Flows not released to the bypassed reach would pass through the powerhouse. The map provided in the city's letter indicates that the city of Yreka A dam intake structure is located on the powerhouse tailrace, but upstream of the fish hatchery intake structure, and the B dam intake structure is located near the downstream end of the bypassed reach. With release of Cal Fish & Games maximum recommended proportional minimum flow, estimated to be 22 cfs, there would still be about 28 cfs passing through the powerhouse and thus available for consumptive use by both the city for municipal purpose and Cal Fish & Game for hatchery purposes without using the B dam for municipal water diversion. However, flows in the bypassed reach could also be available for use by the city via the B dam intake structure. We conclude that the city's water supply would not be compromised regardless of the minimum flow specified in a new license or the measurement method or location agreed upon in our recommended project operations management plan. We see no reason why additional flow monitoring beyond that necessary to ensure compliance with the flow regime specified in a new license, would be necessary. However, we will add the city of Yreka as a consulted entity during the development of our recommended project operations plan, to enable input regarding Fall Creek flow and its measurement. This does not change our conclusions in the EIS.

WQ-17 Comment: The city of Yreka (pp. 3 and 4) expresses concern that recommendations to eliminate diversions from Spring Creek during July and August (up to 16.5 cfs) could have a detrimental effect on the city's water right to withdraw up to 15 cfs from Fall Creek and could have detrimental effects on resident fish and aquatic habitat in the created wetlands of the diversion channels, within the bypassed reach of Fall Creek, and below.

Response: During July and August, the natural flow in Spring Creek is expected to recede to 5 cfs, which is PacifiCorp's estimated minimum observed streamflow value. Based on information provided by PacifiCorp, during the period of record (1933-1959) for USGS gage no. 11512000, diversion from Spring Creek was generally not occurring, and the lowest daily flow recorded at the Fall Creek USGS gage was 24 cfs. The construction of city of Yreka diversion structures occurred in 1969. Since the re-operation of the Spring Creek diversion in 2003 and the temporary reactivation (10/1/2003 to 9/30/2005) of gage no. 11512000 (by Oregon Water Resources Department), located below the powerhouse and below the city of Yreka intakes, minimum daily flow was 21 cfs. Even though the city of Yreka was probably diverting less than its maximum of 15 cfs during this time period, the flow in Fall Creek appears to be sufficient to supply both the city of Yreka and the Fall Creek fish hatchery. The only wetland habitat that we are aware of at this location is in the uppermost section of the bypassed reach, between the left bank of Fall

Creek and the canal which is the result of canal seepage. Farther downstream the gradient increases and wetland vegetation is limited to the margin of the stream. We do not expect any changes in flows which may occur in this reach to adversely influence any wetland habitat along the bypassed reach.

WQ-18 Comment: On pages 3-82 and 3-164 of the draft EIS, we reference a court ruling that settled a lawsuit pertaining to flows released from Iron Gate dam that are to be provided by the Klamath Irrigation Project. KWUA (p. 9) states that, for completeness, our EIS should mention that this injunction is being appealed, to resolve whether provisions of the ESA can require release of previously stored water from Upper Klamath Lake to augment river flows and whether use of previously stored water for irrigation is inconsistent with the ESA .

Response: KWUA's appeal of this court ruling was rejected by the U.S. 9th Circuit Court of Appeals on March 26, 2007. We added text to indicate this to section 3.3.2.1.1, *Water Quantity*, of this EIS.

WATER QUALITY

WQL-1 Comment: PacifiCorp (p. 3-6), commenting on page 3-93, lines 16-18, of the draft EIS, states that it is incorrect to imply that the Oregon 2002 303(d) listings apply to the entire Klamath River from Link River dam to the California border. PacifiCorp points out from the upstream limits of J.C. Boyle reservoir to the California border, the 2002 listing showed this reach as water quality-limited for temperature and the other parameters listed in our draft EIS apply only upstream of J.C. Boyle reservoir. PacifiCorp notes that the 2002 listing was updated in 2006 by Oregon Department of Environmental Quality, and temperature and DO are listed as water quality-limiting parameters from J.C. Boyle reservoir to the state line.

Response: We updated section 3.3.2.1.2, *Water Quality, Affected Environment*, of the EIS to include the current Oregon Environmental Quality proposed listings.

WQL-2 Comment: In addition to the parameters consider to be impaired in the California portion of the Klamath River listed on page 3-93, lines 19-22, the North Coast Regional Water Quality Control Board (p. 1) states that Klamath River waters within the project boundary currently do not meet applicable objectives for pH, ammonia toxicity, taste and odor, floating material, settleable material, and chemical constituents. Consequently, it states beneficial uses that are impaired in the project area include cold, freshwater habitat; rare, threatened, or endangered species; migration of aquatic organisms; spawning, reproduction, and/or early development; commercial and sport fishing; Native American culture; contact and non-contact water recreation; municipal and domestic supply; wildlife habitat; navigation; an agricultural and industrial service supply.

Response: We added the North Coast Regional Water Quality Control Board's determinations of impaired conditions to section 3.3.2.1.2 of this EIS.

WQL-3 Comment: PacifiCorp (p. 3-6) notes that the Oregon DO spawning criteria listed in table 3-24 of the draft EIS apply only from January 1 to May 15.

Response: We revised table 3-24 in the EIS to reflect the clarification PacifiCorp requests.

WQL-4 Comment: PacifiCorp (pp. 3-6 and 3-7) disagrees with our characterization on page 3-108, lines 18-21, of the draft EIS, that total and ortho-phosphorus concentrations tend to increase in a downstream direction from Keno to Iron Gate dams. PacifiCorp states that the data referred to in Campbell (2001) showed no statistical difference between sites and there were flaws in the methods used

by Campbell to calculate phosphorus loads, which PacifiCorp concludes diminish the validity of the Campbell conclusions. PacifiCorp provides supporting discussion for its rebuttal of our characterization.

Response: Based on recent reports filed as part of this proceeding, we modified our discussion in section 3.3.2.2, related to general nutrient trends in the project area. When considering only the river reaches, we state that both total nitrogen and total phosphorus decrease in a downstream manner. Asarian and Kann (2006) attribute this trend to (1) dilution by springs or tributary flows; (2) assimilation by aquatic vegetation; and (3) for nitrogen, denitrification. We continue to recognize that conclusions reported by Campbell (2001) have validity because the trends reported include the project reservoirs as well as the free-flowing reaches. We do not state in the draft EIS that the reported trends have statistical significance. Sponsors of many studies pertaining to nutrient dynamics in the Klamath River, including PacifiCorp, have pointed out the complexity and relative uniqueness of the system, which introduces uncertainties regarding evaluating and predicting the role of project operations and reservoirs in the water quality within and downstream of the project.

WQL-5 Comment: PacifiCorp (p. 3-7), commenting on page 3-108, lines 25-28, of the draft EIS, states that there were no conditions measured that would have led to exceedances of the acute criterion for ammonia in waters within the proposed project area with salmonids present. All the exceedances recorded in 2000-2005 occurred between Upper Klamath Lake and Keno dam. No exceedances of un-ionized ammonia criteria occurred in 2000-2005 within or downstream of the proposed project.

Response: The draft EIS text that PacifiCorp references in this comment is based on page 3-161 of Exhibit E of PacifiCorp's license application, which reads: "Thirty four percent (178 of 519) of ammonia samples throughout the project area in 2000 through 2002 exceeded the acute toxicity criterion. The majority of those samples (64) were from Keno reservoir and from the hypolimnion of J.C. Boyle reservoir (19), Copco reservoir (22), and Iron Gate reservoir (13)." PacifiCorp's comment seems to make the assumption that salmonids do not occur in the hypolimnions of J.C. Boyle, Copco, and Iron Gate reservoirs. Although we agree that salmonids would tend to avoid areas of low DO and high ammonia concentrations, we note that they also avoid warm water temperatures. These factors effectively limit the quantity of habitat available to these fish in Copco and Iron Gate reservoirs during summer stratification, and these limitations are likely reflected in the small numbers of salmonids collected during fisheries sampling at these reservoirs.

WQL-6 Comment: The Water Board (p. 4) finds the organization of the water quality analysis (section 3.3.2.2.2) confusing. The section starts with a discussion of Keno reservoir then switches to a discussion of specific water quality parameters on water temperature, DO, and algae. This section should be reorganized to include a discussion of water quality in each reservoir and river reach. This section does not clearly identify the baseline condition, and does not include a comparison of the impacts or benefits of the alternatives.

Response: Although we used the Water Board's suggested approach for the affected environment section, where we identify baseline conditions for water quality, we chose to organize our effects analysis in section 3.3.2.2.2 by issue, not geographic area. There are pros and cons to each approach; however, we find that the issues cross geographic areas and we want to minimize redundancies inherent in discussing issues by location. Our analysis in section 3 of the EIS is confined to assessing the effects of various environmental measures, which include those proposed by PacifiCorp, specified or recommended by other stakeholders, and developed by staff. Although these measures, when combined in various combinations, represent the four action alternatives that we consider in the draft EIS, we make our recommendations regarding environmental measures that we include in the Staff Alternative in section 5 of the draft EIS. Consequently, the action alternatives have not yet been defined in the resource sections

of section 3, and there is no basis to compare action alternatives in that section. We compare the adverse and positive effects of the four action alternatives on water quality in table 5-1 of the draft EIS.

WQL-7 Comment: On page 3-270 of the draft EIS we state: "…provision of upstream passage over Keno dam would expose upstream migrating suckers to some of the worst water quality conditions in the basin, where DO can drop to lethal levels during the summer months." The Water Board (pp. 4 and 5) states that these water quality conditions are not described in section 3.3.2, *Water Resources*. The EIS should analyze the effects that impoundment of water behind Keno dam has on water quality and how this may relate to low summer oxygen levels. The impacts and benefits of the alternatives described in this section should also be disclosed. Oregon Environmental Quality (p.1) states that the draft EIS is not particularly clear and informative about how the Keno dam and reservoir quantitatively impact water quality within the impoundment and below the dam. The EIS should specifically and fully identify the incremental effect of the Keno development on water quality standards and protected beneficial uses including sensitive aquatic life and the environmental consequences of including or removing Keno development from a new license.

Response: The existing water quality conditions the Water Board is referring to (DO concentrations) are clearly summarized in section 3.3.2.1.2, *Water Quality* (pages 3-102 through 3-105), and conditions in Keno reservoir are specifically shown in tables 3-26 through 3-28. Regarding how the impoundment of water behind Keno dam affects water quality, we dedicate an entire subsection (*Keno Reservoir Water Quality Management*) to the water quality issues relative to Keno reservoir and discuss how the impoundment effects water quality (section 3.3.2.2.2). Also, see our response to the previous comment regarding effects and benefits of alternatives.

WQL-8 Comment: Oregon Fish & Wildlife (p. 80) comments that in general, the draft EIS does not evaluate whether the project or the alternatives meet the water quality standards for the Klamath Basin Plan. Oregon Fish & Wildlife and the Water Board (p. 2) state that the EIS must disclose whether the project under the baseline condition would comply with the Oregon Environmental Quality and Water Board basin plans and standards for Oregon and California, and must address whether the alternatives would meet the water quality standards in the basin plans.

Response: Contrary to the Oregon Fish & Wildlife comment that the draft EIS does not evaluate whether the project meets the water quality standards, we disclose that the states of Oregon and California have listed their portions of the Klamath River in the project area on their respective lists of impaired waters (Clean Water Act Section 303(d)) based on exceedences of water quality standards for temperature, DO, pH, and ammonia toxicity (pages 3-93, 3-96, 3-102, and 3-105 of the draft EIS). Regarding the potential effects on water quality from the Staff Alternative, we do not expect the Staff Alternative to diminish water quality beyond current conditions, our analytical baseline. With regard to whether or not the action alternatives would meet the water quality standards in either the Oregon or California basin plans, we conclude the potential exists for waters within the project area to meet basin plan standards (and, in California, objectives) under all four action alternatives, although it would likely take the cumulative efforts of existing programs currently implemented throughout the Klamath Basin as well as implementation of measures discussed in this EIS to achieve this potential.

WQL-9 Comment: Bruce Campbell (p. 4) requests that the EIS mention exactly what permits are needed in California and Oregon as a prerequisite to relicensing hydroelectric dams on the Klamath both in terms of "Clean Water" permits and otherwise.

Response: We discuss needed certifications under the Clean Water Act in sections 2.3.1.1 of the draft EIS, and other applicable laws and policies in section 5.6 of the draft EIS. We updated these discussions in this EIS.

WQL-10 Comment: Quartz Valley Indian Reservation (pp. 24-26) comments that many figures and tables in the water quality section of the draft EIS do not indicate the number of grab samples collected at each site, the times of year in which samples were collected, or differences in timing of samples collection between sites. Such knowledge is important when interpreting data, and sites with only a few data points should probably be excluded from figures and tables. Figures and tables that mix frequently and infrequently-sampled sites or data collected during difference seasons or years can suggest trends that are simply artifacts of sample collection. Table 3-26 in the draft EIS is cited as an example of this type of issue, where average monthly DO data for stream reaches and reservoirs are presented. The Water Board (p. 5) offers a similar criticism of this same table, stating that monthly averages could mask adverse effects, particularly downstream of Copco reservoir. Some values presented in the table also are highly suspect in the opinion of the Quartz Valley Indian Reservation, most likely the result of an artifact of low number of samples. The EIS should make use of the automated probe data for DO, temperature, and pH reported and summarized in Asarian and Kann (2006) and filed with the Commission.

Response: Given the size of the record and the amount of attention given to water quality, we conclude it is appropriate to present a document that summarizes the key trends, is easy to understand, and does not weigh the reader down with conditional language for every record of data. We developed the tables in the water quality section for summary purposes from the data filed as part of the license application in most, but not all cases. Clearly however, water quality conditions for many parameters are not static and some change dramatically throughout the seasons (e.g., temperature) and even throughout the day (e.g., DO and pH). For this reason we updated selected tables (table 3-25 and 3-26 of the draft EIS) in section 3.2.2 with the number of samples taken and have added new figures to this EIS using data provided in the TMDL master database. Additionally we added language in this EIS that provides some context as to the sample sizes used in some of the tables.

WQL-11 Comment: Quartz Valley Indian Reservation (p. 27) states that the caption for table 3-26 indicates that average DO data for the years 2000 to 2004 are presented, but the source of the table is listed as the license application, filed in 2004. Either the caption or the source appears to be incorrect.

Response: The source that we cite for table 3-26 in the draft EIS is incorrect. The correct source is data posted on PacifiCorp's relicensing web page. Although data from 2000 through 2003 is summarized in the license application, the raw data that we used to develop table 3-26 and several other tables and figures in the draft EIS is from the web page. In this EIS, we include the corrected source information for the affected tables and figures.

WQL-12 Comment: Quartz Valley Indian Reservation (p. 26), Karuk Tribe, Yurok Tribe (p. 26), and Resighini Rancheria (p. 26) state that many figures and tables in the water quality section of the draft EIS are cited as "(Source: PacifiCorp, 2004a, as modified by staff)" but it is unclear whether a particular figure or table was originally created by PacifiCorp, or whether Commission staff created the figure or table from data provided by PacifiCorp. If the latter, the Quartz Valley Indian Reservation, Karuk Tribe, and Resighini Rancheria suggest that we change the source citation to: "(Source data: PacifiCorp, 2004a, as modified by staff)."

Response: The sources for our figures in this EIS are presented following standard Commission style guidance for its NEPA documents. If the staff modifies the original figure, no matter what the modification is, we indicate so by stating "as modified by staff" in the source caption. If we modify the figure or if we create a figure from other data, we want to let the reader know that we modified the information from what was presented in the original document or data.

WQL-13 Comment: Quartz Valley Indian Reservation (p. 26) states that most of the tables and figures in the draft EIS depicting water quality do not include sites downstream of the immediate project area.

As such, they do not provide proper context for understanding the basin-wide spatial trends in temperature, DO, pH, nutrients, and algae.

Response: We added data from additional sites below Iron Gate dam to this EIS that show temperature, DO, nutrients, and pH. Figure 3-36 in the draft EIS summarizes chlorophyll *a* concentrations (a measure of planktonic algae) in the Klamath River below Iron Gate near Cottonwood Creek (RM 182.38), Shasta River (RM 176.07), Beaver Creek (RM 160.75) and Scott River (RM 142.60). We note that figures 3-25, 3-26, and 3-27 of the draft EIS summarize water temperature at the same locations.

WQL-14 Comment: Quartz Valley Indian Reservation (p. 27), Karuk Tribe, Yurok Tribe (p. 28), and Resighini Rancheria (p. 27) comment that figures 3-31 through 3-34 of the draft EIS, that show Klamath River nutrient levels at various locations is illegibly blurry and would be more useful as box plots with median, interquartile ranges, and outliers, rather than the minimum, mean and maximum plots presented. If the data in the figures came from the 2000-2003 spreadsheet posted on PacifiCorp's website, the 2000 data is flawed because a cell was inadvertently deleted by PacifiCorp showing data collected in August when it was actually collected in September, or data from the beginning and end of the sampling season was shifted from one site to another. Consequently, if our source was that website spreadsheet, we should not use the 2000 data. Quartz Valley Indian Reservation, Karuk Tribe, Yurok Tribe, and Resighini Rancheria state that substantial additional datasets from agencies and tribes are available and have been summarized in Asarian and Kann (2006), and should be used in the EIS.

Response: Regarding the recommendation to use box plots to summarize the nutrient data, we conclude that although box plots are a viable way to present a large amount of information in a graphical way; in many applications there are aspects to their presentation that may confuse some readers leading to a misinterpretation of the data and perhaps erroneous conclusions. For this reason we stand by our use of the minimum, median, and maximum presentation for nutrients, where possible.

In response to the tribes' statement that the spreadsheet posted on PacifiCorp's web site contained a flawed data presentation for the year 2000, we reviewed the spreadsheet and have not been able to confirm or refute this statement. We conducted a sensitivity analysis to assess whether the trends in longitudinal nutrient distribution shown in figures 3-31 through 3-34, of the draft EIS, substantively change if the data from 2000 is replaced with data from 2004. We conclude that the trends remain the same and therefore, substituted year 2004 data for 2000 data (without judging the validity of the 2000 data) in the analogous figures in this EIS (figures 3-41 through 3-44). We also supplement this with nutrient information from other sources, including Kier Associates (2006), which summarizes the dataset compiled by TetraTech as part of ongoing TMDL work in the Klamath River Basin. In addition, we addressed concerns related to blurry figures which seem only to be associated with electronic versions of the draft EIS.

WQL-15 Comment: Quartz Valley Indian Reservation (p. 28) states that the information provided in table 3-29 of the draft EIS is useful, but would be improved substantially by including information regarding the number of samples collected and adding information about nitrate, organic nitrogen, and total nitrogen.

Response: We updated the table in question to include the number of samples collected for each record shown. We do not agree that including information about nitrate, organic nitrogen, and total nitrogen would substantially improve the understanding of water quality in the river with respect to the analysis in section 3.3.2.2.2, because it is well documented that the Klamath River is high in nutrients and the parameters important to the aquatic resources (algae and anadromous fish) are already presented.

WQL-16 Comment: Quartz Valley Indian Reservation (pp. 27 and 28) states that table 3-30 in the draft EIS suffers from a lack of any information regarding organic nitrogen (typically the most abundant form of nitrogen in the Klamath River) or total nitrogen, makes no mention of the number of samples, the likely inclusion of the erroneous PacifiCorp 2000 data, failure to use all available data, no data from downstream of Shasta River, and no indication of whether we include PacifiCorp's filtered or unfiltered samples for 2004, or both.

Response: As mentioned above, we disagree with the need to include more details on organic nitrogen concentrations for the sake of including more information. We included the pertinent information that the following sections rely on for our analysis. As for the number of samples used to calculate the averages presented in the section, we added the range of the sample sizes for the records shown in table 3-30 of the draft EIS.

WQL-17 Comment: On page 3-113, line 23, of the draft EIS we state: "Seasonal changes in water quality constituents below Iron Gate dam are not large (table 3-30)." Quartz Valley Indian Reservation (p. 28) comments that this statement does not appear to be supported by the available data. An increase in nitrate values from about 0.2 mg/L in the May-August period to about 0.4 mg/L in the September-November period is characterized in the draft EIS as slight, a substantial understatement considering that it is a doubling of concentration. The draft EIS should note that the 1.99 mg/L average ammonia concentration above the Shasta River is driven largely by a single, seemingly impossibly high measurement in 2004 of 3.84mg/L. Asarian and Kann (2006) analyzed seasonal and interannual variations in total nitrogen in the Klamath River from 1998 through 2002 and found that in most years, there is a seasonal difference in total nitrogen concentrations below Iron Gate dam, with values typically higher in August-November than May-July.

Response: Although a doubling of concentration as pointed out by the Quartz Valley Indian Reservation can often be considered large, there are a number of factors that support our use of "not large" in this case, including the parameter involved, the season of the increase, and relatively low initial concentrations. When the low initial concentrations are relatively small, by definition it does not take a large increase to double the concentration, as is in this case when the concentration doubles from 0.2 to 0.4 mg/L. The season of the increase and the form of nitrogen can play important roles in water quality as nitrogen forms that are easily assimilated by plants can act as fertilizers promoting vigorous growth of algae and other aquatic plants which can be exacerbated during the summer season when water temperatures are high. Algae and other aquatic plants are capable of altering the DO and pH conditions in the water through photosynthesis and respiration. In this case, nitrate is a form of nitrogen that is not easily assimilated by plants and in fact needs to be converted through a biochemically intensive process before most plants can readily use it for metabolic processes. The higher concentrations of nitrates in table 3-30 occur in September to November, which is the end of the growing season, so increased concentrations of nitrate are unlikely to make their way into the aquatic plants which are capable of modifying DO and pH conditions.

As for the high average ammonia concentration reported above the Shasta River, we added a note to the table indicating it is due to a single high reading. In addition, we enhanced our discussion of seasonal nutrient trends in this EIS based on new reports filed as part of the record for this proceeding.

WQL-18 Comment: On page 3-115, lines 5-6, of the draft EIS, we state: "In Copco and Iron Gate reservoirs, BOD is lower and sediment effects become a more important influence on the quality of the overlying water." Quartz Valley Indian Reservation (p. 28), Karuk Tribe, Yurok Tribe (p. 29), and Resighini Rancheria (p. 28) ask for the evidence to support this assertion and suggest that the EIS cite the source or provide specific data that supports this statement, or delete the statement.

Response: The source of all the information in the paragraph on page 3-115, lines 1-6, is Eilers and Gubala (2003) which is cited in chapter 9 of the Water Resources Final Technical Report (PacifiCorp, 2004f), part of PacifiCorp's license application. We added a third citation of this source to the last sentence in the paragraph. The evidence to support the statement can be found on page 9-10 of the Water Resources Final Technical Report (PacifiCorp, 2004f

WQL-19 Comment: Quartz Valley Indian Reservation (p. 28), Karuk Tribe, Yurok Tribe (p. 29), and Resighini Rancheria (p. 28) note that the spatial trends of chlorophyll *a* concentrations that seem evident in figure 3-36 of the draft EIS could be meaningless, given the larger monthly variations shown in figure 3-35, if the sites were not sampled at the same time of year.

Response: We replaced figure 3-36 in the draft EIS with a new figure that shows the seasonal trends of chlorophyll *a* concentrations at four locations in the Klamath River below Iron Gate dam.

WQL-20 Comment: Quartz Valley Indian Reservation (p. 28), Karuk Tribe, Yurok Tribe (pp. 14 and 30), and Resighini Rancheria (p. 28) state that the discussion of *Microcystis* in the affected environment section (page 3-117 of the draft EIS) should be re-written to incorporate the information included in Kann (2006) and Kann and Corum (2006).

Response: We reviewed the suggested materials and incorporated pertinent information into this EIS.

WQL-21 Comment: Quartz Valley Indian Reservation (p. 29), Karuk Tribe, Yurok Tribe (p. 30), and Resighini Rancheria (p. 29) comment that our citation of "Kahn et al. in 2005" on page 3-117, line 10, and "Dr. J. Kahn" on line 18 of the same page should be "Kann" and these citations do not appear in the literature cited section.

Response: We corrected the in-text citations and added the full citations to section 6.0, *Literature Cited* of this EIS.

WQL-22 Comment: Quartz Valley Indian Reservation (p. 29), Karuk Tribe, and Resighini Rancheria (p. 29) suggest that we add the following sentence to page 3-118, line 5, of the draft EIS to emphasize that the *Microcystis* blooms detected in project reservoirs during 2005 did not represent an abnormal year: "SWRCB (2006) issued a similar health advisory again in 2006, noting that *Microcystis* concentrations in the reservoirs were higher in 2006 than 2005."

Response: We added the proposed language to the discussion on *Microcystis* blooms in this EIS.

WQL-23 Comment: Quartz Valley Indian Reservation (p. 29), Karuk Tribe, Yurok Tribe (p. 30), and Resighini Rancheria (p. 29), commenting on page 3-118, line 22, of the draft EIS, suggest that we add a sentence that directs the reader to additional periphyton data contained in an appendix to the Hoopa Valley Tribe's water quality standards, issued in 2006.

Response: We reviewed the Hoopa Valley Tribe's water quality standards which include a discussion on a collaborative periphyton sampling effort conducted in the Klamath River in 2004 that concludes that inter-annual biomass variability is likely substantial. To enhance the discussion of periphyton in this EIS, we added references to the 2004 sampling effort and conclusions regarding attached algae to section 3.3.2.1.2 of this EIS.

WQL-24 Comment: Quartz Valley Indian Reservation (pp. 29 and 30), Karuk Tribe, Yurok Tribe (pp. 30 and 31), and Resighini Rancheria (pp. 29 and 30) suggest that we delete the paragraph pertaining to PacifiCorp's phytoplankton sampling results on lines 6-12, of page 3-118, of the draft EIS, because using

mean algal abundance does not appropriately account for large colonies of important species of algae. Three paragraphs are provided to replace the deleted paragraph, focusing on the spatial distribution of *Microcystis* in the project area.

Response: Mean algal abundance is an appropriate way of reporting summary results generated from efforts such as PacifiCorp's phytoplankton sampling. We recognize that recently published reports related to this issue have added information relevant to the understanding of algae distribution in the Klamath River. Consequently, we added to our discussion of phytoplankton on page 3-118 of the draft EIS relevant findings reported by Kann and Asarian (2006), and Kann (2006).

Environmental Analysis and Recommendations

WQL-25 Comment: PacifiCorp (pp. 2-3 and 5-4) states that our recommendations pertaining to water quality should correspond to measures developed for Section 401 water quality certification from the appropriate state agencies. The Hoopa Valley Tribe (pp. 28-30) states that the Staff Alternative should result in an alternative that complies with the water quality standards of Oregon, California, and the Hoopa Valley Tribe, even if that alternative requires removal of project facilities.

Response: CWA section 401 water quality certification is a process undertaken by states to ensure proposed projects do not negatively affect water quality. At the time of this writing, water quality certificates have not been issued for the project. Our recommendation to develop a single, comprehensive water quality management plan is well suited to correspond to measures developed for section 401 water quality certification, as those measures would be included with the plan and filed with the Commission. However, because issuance of water quality certifications with associated conditions are not likely to occur until well after this EIS is issued, we cannot incorporate measures that may be incorporated into those certifications into our analysis.

With regard to the Hoopa Valley Tribe's comment, our recommendations included in the Staff Alternative are intended to enhance existing project-related water quality using measures that are under PacifiCorp's control and the Commission's jurisdiction. Achievement of water quality standards and objectives is likely to require cooperative measures by PacifiCorp and others, and it would be up to the states of Oregon and California to determine whether their basin plan objectives are met.

WQL-26 Comment: North Coast Regional Water Quality Control Board (pp. 2-4) states that although the draft EIS lists some of the designated existing and potential beneficial uses to be protected for waters within the project boundaries in California, some beneficial uses have been entirely omitted or the hydrologic areas they represent not listed including the following: (1) Native American culture, an existing use at various locations in both the Middle and Lower Klamath hydrologic area; (2) industrial service and process supply, a use in the Lower Klamath hydrologic area, potential use of the Klamath Glen hydrologic sub area, and an existing use of the Orleans hydrologic sub area; (3) marine habitat, an existing use of the Lower Klamath hydrologic area in the Klamath Glen hydrologic sub area; and (4) shellfish harvesting, an existing use in the Middle Klamath hydrologic area in the Iron Gate hydrologic sub area and in the Lower Klamath hydrologic area, a potential use in the Orleans hydrologic sub area and an existing use in the Klamath Glen hydrologic sub area. The EIS must include the above beneficial uses, assess the current status of these and all other applicable beneficial uses in the project area, fully evaluate the project's contribution to impairment of beneficial uses, and demonstrate how PacifiCorp would mitigate all adverse impacts of the project on beneficial uses. The EIS must also assess the current status of applicable water quality objectives and demonstrate how the proposed project would achieve and maintain all water quality objectives to fully protect the designated beneficial uses.

Response: On page 3-93, lines 9-10, of the draft EIS, we indicated Native American culture as an existing use from Seiad Valley to the Pacific Ocean, which includes both the Middle and Lower hydrologic areas, and this EIS reflects this clarification. We updated this EIS to include the additional beneficial uses. With regard to the NCRWQCB's comment that the EIS must assess the current status of these and all other applicable beneficial uses in the project area, we provide water quality objectives in table 3-24 and summarize existing conditions in section 3.2.2.2.1, *Affected Environment*. Our recommendations included in the Staff Alternative are intended to protect and enhance existing project-related water quality using measures that are under PacifiCorp's control and the Commission's jurisdiction. Achievement of water quality standards and objectives is likely to require cooperative measures by PacifiCorp and others, and it would be up the states of Oregon and California to determine whether their basin plan objectives are met.

WQL-27 Comment: North Coast Regional Water Quality Control Board (p. 2) states that when other factors result in degradation of water quality beyond the levels or limits established as water quality objectives in the Basin Plan, controllable factors shall not cause further degradation of water quality. The EIS must describe how the project would assure that all controllable factors are managed to ensure no further degradation of already impaired waters entering the project area, consistent with the federal antidegradation policy. This policy prohibits an activity or discharge if the activity would lower the quality of surface water that is not sufficient to support designated beneficial uses, as is the case in the project area.

Response: We recognize that existing conditions may include instances when factors associated with the project result in further degradation of water quality. For example, we recognize that water entering the project is rich in nutrients; however, under some conditions, operation of Copco and Iron Gate developments promote conditions conducive for algal blooms including the toxic *Microcystis* and releases of the toxin microcystin further degrading the REC-1 and REC-2 beneficial uses. To address issues such as these, PacifiCorp proposes, and staff recommends, measures designed to enhance water quality over existing conditions, including measures to improve temperature, DO, and nutrient concentrations that support algae blooms. The measures in this EIS to develop a comprehensive water quality management plan and temperature and DO enhancements would assist in addressing the "controllable factors" responsible for degradation beyond existing conditions (e.g., release of toxins) and are discussed in section 3.2.2.2.2, *Water Quality*. We do not expect any of the proposed and recommended measures to further degrade waters in the project area.

WQL-28 Comment: North Coast Regional Water Quality Control Board (pp. 3 and 4) agrees with our conclusions that significant water quality degradation occurs in the upper reaches of the Klamath River. However, it adds that the project exacerbates the impaired conditions and adverse cumulative impacts and creates degradation beyond what is contributed by the source waters, leading to violations of the controllable factors provisions and antidegradation policies of the Basin Plan. Project reservoirs create stagnant, heated water that violates objectives for temperature. The high temperatures promote algal blooms which fix nitrogen, produce toxins in toxic amounts, deplete DO, and create conditions of nuisance and pollution not present in the source waters. The draft EIS describes proposals by PacifiCorp designed to improve water quality conditions in the project area which would be implemented once the project is relicensed. However, in its opinion, the proposals are experimental and none ensure that all adverse impacts of the project can be mitigated to the levels necessary to achieve Basin Plan water quality objectives and restore the impaired beneficial uses. The proposals, at best, ensure status quo or minor improvements in some water quality parameters, usually to the detriment of others. Klamath Riverkeeper et al. (pp. 10 and 11) comments that although the draft EIS points out that even with the recommended water quality measures, some continued adverse effects on water quality would likely continue; dam removal is rejected. Both entities comment that the EIS must present an alternative that ensures the project fully complies with all applicable water quality standards for the project, in order for the project to

be considered for water quality certification. American Sportfishing Association (p. 4) indicates that although we identify a wide variety of water quality impacts related to the project, the draft EIS does not affirm that any of the recommended actions would be effective in addressing the impacts and meeting applicable water quality objectives. Fishermen's Association of Moss Landing (p. 1) states that the existence of the four dams, with their stagnant, toxic reservoirs is one of the primary causes of river conditions that are destructive to downstream Chinook salmon stocks and resulted in the virtual closing of the commercial salmon season along the entire California coast.

Response: The draft EIS acknowledges on page 3-93 that the existing conditions violate the Basin Plan water quality objectives and discloses that sections within both Oregon and California are listed as impaired under section 303(d) of the CWA. We also acknowledge on pages 3-117 and 3-118 that microcystin can limit beneficial uses (e.g., REC-1 and REC-2) beyond what is already included in the 2006 impaired waterbody list. However, providing assurance that the Staff Alternative would fully eliminate water quality impacts and would achieve compliance with the standards and objectives of the Basin Plan is not a primary purpose of this EIS because there are many factors, some of which occur outside the Commission's jurisdiction, that result in the conditions attributed with the degradation. The purpose of this EIS is to disclose the existing conditions and evaluate the proposed and potential measures under the Commission's jurisdiction so as to understand the potential consequences of a new license. Many reservoirs and natural lakes foster warm surface water that under eutrophic conditions, leads to algal blooms. In some instances, such effects may not be controllable. We revised our recommendations in this EIS to include a timetable for developing and implementing water quality enhancement measures. In addition, as part of our recommended fish passage and disease management program, water quality monitoring would occur for a period of at least 5 years and assessments made regarding manipulating project operations to assess effects on factors that pertain to fish diseases (among other objectives). This adaptive program may lead to long term solutions to at least some project-related water quality problems. Although the water quality measures may not fully achieve basin plan objectives by themselves, the combined efforts of the recommended measures, with the TMDL and CIP processes may enhance water quality conditions to the point where water quality objectives and beneficial uses are met.

WQL-29 Comment: The Hoopa Valley Tribe (pp. 30 and 31) states that it has status as a "downstream state" in the water quality certification process for this project, and neither California nor Oregon can issue certification if it is not consistent with the Tribe's standards, even though the Tribe does not issue its own certification in this proceeding. The draft EIS does not even mention the Tribe's Water Quality Control Plan (which has been recently updated and is included with the Tribe's comments), let alone consider how the project can be licensed in a manner consistent with the Tribe's standards, which is inconsistent with the Commission's own regulations and NEPA. The EIS must consider the updated plan and standards.

Response: We included reference to the Tribe's applicable water quality standards for relevant parameters in section 3.3.2.1.2 of this EIS.

WQL-30 Comment: Luke Ackerman (p. 1) comments that project reservoirs create an ideal environment for the formation of methyl-mercury which would not exist in a free-flowing river system. Such methyl-mercury can bioaccumulate and also presents a serious health risk to humans. He states that our draft EIS does not adequately take into account the elevated exposure of organisms to benthic pollutants such as methyl-mercury and we should do so.

Response: On page 3-121, lines 1-6, of the draft EIS, we report that all measured concentrations of total mercury in fish tissue, which would include methyl-mercury, are well below the screening values for human health. Some composite samples (two from Iron Gate reservoir and one from Copco reservoir) were above screening values for wildlife, which is not unusual in most water bodies in the United States,

but the remaining seven samples were below the screening value for wildlife. GEC (2006) analyzed 27 sediment samples for various chemical contaminants including mercury. GEC reported mercury in a single sample taken from Copco reservoir at 0.05 mg/kg, below the Puget Sound Dredge Disposal Analysis criterion of 0.41 mg/kg. We conclude that there is no evidence that project reservoirs are contributing to a risk of increased methyl-mercury bioaccumulation in fish or wildlife or that mercury in project reservoirs is posing a human health risk.

WQL-31 Comment: NMFS (p. 20) comments that the draft EIS does not predict the jurisdiction of Keno in the future (draft EIS at 3-132, lines 40-42). The environmental measures in the Staff Alternative include implementation of reservoir management plans, and a single, comprehensive water quality management plan for improving water quality in all project-affected waters. Water quality would be addressed at J.C. Boyle, Copco, and Iron Gate reservoirs, but possibly not at Keno reservoir. NMFS, Oregon Fish & Wildlife (p. 79-80, 85), the Forest Service (pp. 1 and 2 of 4), and the Water Board (p. 5) comment that the Staff Alternative apparently relies on the Total Maximum Daily Load (TMDL) and Conservation Implementation Program (CIP) processes to address water quality at Keno reservoir (draft EIS at 3-155, 38-48 and at 3-156, 1-11). However, these processes have different requirements, authorities, and timelines, and there is no guarantee that water quality problems at Keno reservoir would be addressed. If Keno is retained, resource impacts from facilities and operations would be under the Commission's authority, and therefore, must be addressed in any new license. Therefore, the water quality impacts of Keno reservoir need to be addressed by PacifiCorp, and Keno reservoir should be explicitly addressed in the Staff Alternative.

Response: Whether or not Keno development, and associated environmental measures, can be incorporated into a new license is a jurisdictional rather than an environmental issue. If Keno development does not serve project purposes, the Commission cannot exert jurisdiction over PacifiCorp to take specific actions that may enhance water quality in Keno reservoir. This determination would be made by the Commission in its order pertaining to this proceeding. Consequently, in section 5.2.19 of this EIS we now account for a potential Commission determination that Keno development should continue to be under the Commission's jurisdiction by specifying that measures to enhance water quality in Keno reservoir would be addressed in our recommended comprehensive water quality management plan. In our draft EIS, this was implied in our description of measure 4P, on page 5-2, but not overtly stated in section 5.2.19. If the Commission should determine that Keno development is not jurisdictional, long-term measures to address water quality in Keno reservoir could not be required or enforced by the Commission. That does not mean that long-term measures to address Keno reservoir water quality could not be implemented, and we reference the TMDL and CIP programs as potential avenues that could result in coordinated efforts to address this serious ongoing water quality issue.

WQL-32 Comment: The Forest Service (pp. 1 and 2) comments that specific provisions should be included in the recommended water quality management plan such that if project-exacerbated nutrient levels cannot be feasibly mitigated through operations or facility changes during critical low flow, warm periods, then off-site mitigation (controlling the amount of nutrients and algae released into project reaches and reservoirs) may be the best alternative short of decommissioning all project reservoirs that contribute to water quality degradation. The Forest Service concludes that it would be appropriate for the EIS to offer necessary and tangible project mitigation prior to consideration by other agencies in the TMDL, CIP, or water quality certification process. Nutrient assimilation can be initiated further upstream than Iron Gate development, and could include such measures as restored wetlands at Upper Klamath Lake, Lake Ewauna, and the river. Treatment of Klamath Straits Drain discharges should also be investigated. Quartz Valley Indian Reservation (p. 39) believes that the Commission has the authority to place conditions on Keno dam even if it is removed from the project. Therefore, if the Commission should remove Keno development from the project, PacifiCorp still should be required to cooperate and fund efforts to improve water quality in Keno reservoir through nutrient load reductions. NMFS (p. 47),

Interior (pp. 40 and 41), the Forest Service (pp. 1 and 2), and Oregon Fish & Wildlife state that water quality management at Keno reservoir should also be explicitly required in measure 4P even if Keno development if not included as part of a relicensed project.

Response: Off site mitigation for water quality improvements prior to reaching project reservoirs, as suggested by the Forest Service, has merit, if project-exacerbated nutrient levels cannot be feasibly addressed at project reservoirs. We identified Keno reservoir as the most likely site for such nutrient remediation on pages 3-133, lines 42-48, and 3-134, lines 1-9, of the draft EIS, contingent on Keno development remaining within the project. We discuss this possibility further on page 3-149, lines 7-22, of the draft EIS. However, if Keno development is determined by the Commission to be non-jurisdictional, the implementation of long-term water quality enhancement measures in Keno reservoir could not be a requirement of any license issued for the project. We are in complete agreement with the Forest Service that treatment at Klamath Straits Drain discharges should be investigated. Such discharges are completely controlled by Reclamation and therefore any such investigations and implementation of treatment should be Reclamation's responsibility.

WQL-33 Comment: EPA (p. 8) states that on pages 3-49, 3-133, and 3-156 of the draft EIS, we refer to Reclamation's CIP as the forum in which water quality management plans should be developed. EPA notes that the CIP as currently drafted is focused on federally listed species and does not include improving water quality or addressing Oregon and California water quality standards or TMDLs as a primary objective. Therefore, EPA believes that the CIP process may not be an appropriate mechanism for the development of water quality management plans, but instead believes that allocations determined under the TMDL process would be an effective basis for project-specific water quality management plans and that management actions should be directly linked to TMDL Implementation Programs carried out in both states.

Response: Our references to the CIP and TMDL processes on the three pages of the draft EIS referenced by EPA are intended to disclose ongoing parallel processes that pertain to water management and water quality enhancement. The Commission has no jurisdiction over either of these processes, but we can recommend that PacifiCorp incorporate appropriate elements over which it has control into our recommended comprehensive water quality management plan. We never state that we intend to defer to either the CIP or TMDL processes to address project-related water quality issues, but we recognize that effectively addressing these complex issues would require cooperative efforts. On page 3-149, lines 10-12, we state: "…we conclude the forthcoming TMDL and Reclamation's CIP would address loads entering the Klamath River and we consider it unreasonable to assign to PacifiCorp the responsibility of nutrient removal prior to reaching the project." This statement is not meant to imply that once water is within the project and influenced by project operations, PacifiCorp would only be implementing measures in accordance with the TMDL or CIP. To be clear, our recommended comprehensive water quality management plan is intended to be a stand alone document, developed under the Commission's jurisdiction but with input from other relevant sources to ensure that measures implemented by PacifiCorp to address project-related water quality issues are synchronized with parallel measures implemented by others. We would recommend such a plan even if there were no ongoing TMDL or CIP processes.

WQL-34 Comment: Humboldt County (p. 3) notes that our description of the CIP in section 3.3.2.3 of the draft EIS does not appear to be directly connected to the relicensing of the project. Reclamation's proposed CIP is a stakeholder-driven forum for the Klamath watershed, but currently there is no funding source to support CIP activities, nor is any authority conveyed to this proposed stakeholder-driven group that would compel any agency to comply with the recommendations. Consequently, Humboldt County concludes that as a condition of license renewal, the Commission should require PacifiCorp to include a minimum of $5 million annually to fund CIP activities.

Response: Humboldt County is correct that the CIP discussed in section 3.3.2.3, *Cumulative Effects*, is not directly connected to relicensing. However, we conclude that project-related water quality is cumulatively affected by operation of the Klamath Irrigation Project, hence measures to address water quality that may be specified in the CIP, if and when funding becomes available to implement such measures, would indirectly influence project-affected waters. We would not recommend funding by a licensee for unspecified activities that may be identified when the CIP is finalized. However, if an activity has a nexus to the purposes of the hydroelectric project, it could be incorporated as an element of our recommended water quality management plan.

WQL-35 Comment: Klamath Riverkeeper et al. (p. 10) states that the draft EIS does not disclose cumulative watershed impacts with other past, present, and future actions. Upcoming and recent actions that have a cumulative effect on water quality related to project dams include: the Klamath Irrigation Projects coho salmon BiOp, the Scott and Shasta watershed-wide incidental take permits and streambed alteration agreements, the CIP, recent Pacific Fisheries Management Council regulation changes on fishing for Klamath salmon, the Freemont-Winema grazing allotments NEPA process, Klamath, Scott, and Shasta river TMDLs, the Cal Fish & Game coho salmon recovery strategy, the California Coastal Commission's sediment report, ongoing flow negotiations, impacts of Klamath Straights Drain water transfers, NPDES permits on Keno reservoir, updating and current violations of the Iron Gate Hatchery NPDES permit, upstream regulation and impacts of Concentrated Animal Feeding Operations on reservoir pollution, the Klamath Projects NDPDES permit, Forest Service and private land management, the stream and wetland protection policy, draining of Klamath wetlands, and many other past, present and foreseeable activities.

Response: All of the cumulative effects associated with the numerous items listed by the Klamath Riverkeeper et al. are disclosed in the draft EIS, either specifically or as part of an overarching program. For example, NPDES permits themselves are not a source of cumulative water quality impact, but point source effluents that such permits regulate may adversely affect water quality, leading to the need for TMDLs. TMDLs relevant to project-related cumulative effects are disclosed in sections 3.3.1.3, *Geology and Soils* and 3.3.2.3, *Water Resources* and throughout the remainder of section 3.3.2. Reclamation's CIP is an outcome of BiOps from FWS and NMFS and all are discussed on numerous occasions in sections 3.3.1, 3.3.2, 3.3.3, and 3.3.5, and their cumulative effects disclosed in sections 3.3.1.3, 3.3.2.3, and 3.3.3.3. Cumulative effects associated with land use practices including agricultural, forestry, and wetland draining are disclosed in the previously mentioned three cumulative effects sections as well as in the cumulative effects section 3.3.5.3, *Threatened and Endangered Species*. California's coho salmon recovery strategy is discussed at length in section 3.3.5.1.2 of the draft EIS and effects of relicensing the project on this strategy are disclosed in section 3.3.5.2.2 of the draft EIS.

WQL-36 Comment: The Water Board (p. 5) states that the Commission can require that a licensee assume responsibility for any future TMDL load allocation and commit to other water quality improvements.

Response: The Commission has the authority to enforce any conditions that are included in a new license, including those recommended by Commission staff and those mandatory conditions specified by others, such as conditions associated with a water quality certification.

WQL- 37 Comment: On pages 3-136 and 3-137 of the draft EIS we state: "PacifiCorp analyzed the hypothetical release of hypolimnetic water from both Copco and Iron Gate reservoirs using the CE_QUAL-W2 modeling system which has since been incorporated by the EPA into their technical analysis of the forthcoming Klamath River TMDL, giving the model a high level of credibility." Quartz Valley Indian Reservation (pp. 30 and 34), Karuk Tribe, Yurok Tribe (pp. 31 and 32), and Resighini Rancheria state that this model has less credibility for analysis of DO, nutrients, attached algae, and

phytoplankton, and suggest we add the following phrase to the sentence: "…for predicting flow and temperature." Additional suggested text is provided by the tribes, pointing out that the model does not accurately predict nutrients, algae, pH, and DO for inclusion at the end of line 8, on page 3-139, where we discuss DO remediation, and the end of line 32, on page 3-150, where we discuss dam removal to enhance water quality.

Response: The referenced text on pages 3-136 and 3-137 of the draft EIS is in the *Water Temperature Remediation* subsection and is intended to support the validity of our use of the CE QUAL-W2 model results for our analysis of the hypothetical release of hypolimnetic water as it pertains to flow and water temperature. To clarify this point, and to address these concerns, we have added language to the section in question that clarifies the water quality model is credible for the analysis of flows and temperatures. We do not discuss other water quality parameters in this subsection, and see no need to point out the models limitations with regard to predicting parameters that are not directly related to flow and temperature. As for the discussion and analysis related to DO, we acknowledge on pages 3-138, line 48, and 3-139, lines 1-3, that it is difficult to distinguish project-related effects on DO, whether by modeling or field measurements, because of numerous variables that influence DO concentrations. We do not consider it necessary to further qualify the limitations of predicting DO levels. However, modeling results still provide planners and managers with an additional tool in assessing the likely results of potential actions, as long as the limitations are understood. In the absence of a more powerful predictive tool, we conclude that consideration of PacifiCorp's modeling results in our analysis, which we requested in AIR AR-2, is appropriate.

WQL-38 Comment: The Klamath (pp. 14 and 15) and Yurok (p. 46) tribes state that our analysis of project-related thermal effects in the draft EIS is simplistic and inaccurate, and should rely on the work of Dunsmoor and Huntington (2006) and Bartholow et al. (2005), rather than PacifiCorp's modeling in response to AIR AR-2. Data from Dunsmoor and Huntington (2006) is used in tables 3-68 to 3-70 to describe existing conditions, but only in figure 3-39 do we report dam removal scenarios evaluated in Dunsmoor and Huntington (2006), although we inappropriately attribute it to "Resighnini Rancheria (2006)". The draft EIS cites the work of Dunsmoor and Huntington (2006) several times to support trap and haul rather than volitional fish passage in the analysis of anadromous fish restoration, but fails to use the analyses presented in Dunsmoor and Huntington (2006) in the analysis of the dam removal alternative, which was the major focus of this study. Where the draft EIS addresses the thermal impacts of the project and likely results of dam removal, the complexity of the topic is glossed over and the magnitude of dam removal benefits to anadromous fish are understated. Failure to thoroughly integrate the analysis of Dunsmoor and Huntington (2006) into the EIS will render it incomplete and subject to subsequent challenge.

Response: To enhance our analysis of dam removal alternatives on water temperatures we added additional figures from the Dunsmoor and Huntington (2006) report summarizing 2 week temperature statistics below each dam under existing conditions and without project scenarios. Showing these 2 week summaries is a clear and concise way to compare the expected temperature regime without project to the existing conditions, and permits a more detailed evaluation of project effects on water temperatures than Bartholow et al. (2005), which focused on effects on mean daily and mean monthly water temperatures downstream of Iron Gate dam. We discuss the ramifications of the expected changes in temperatures in section 3.3.3, *Aquatic Resources.*

WQL-39 Comment: EPA (p. 5) indicates that in the draft EIS, we conclude that temperature control structures would have negligible benefits for mitigating temperature impacts, but our analysis assumes that all hypolimnetic cold water would be released as part of any such mitigation. EPA believes that use of the hypolimnetic cold water, managed and mixed with warmer waters to lower water temperatures, could more closely mimic natural conditions and would not involve draining all coldwater from the

hypolimnion in the manner discussed in the draft EIS. EPA states that our analysis of potential selective withdrawals on page 3-138 of the draft EIS is limited to two modeling scenarios and does not evaluate the capability of a multi-port selective withdrawal structure. EPA believes that the reduction of water temperature by 0.5 or 1.0^{o} C through mixing of epilimnetic and hypolimnetic waters over several weeks or a month during critical periods may mitigate water quality impacts and enhance fisheries. Therefore, EPA recommends that the EIS include the following: (1) consideration of the capabilities of a multi-port, selective withdrawal structure; (2) additional modeling scenarios of varying duration developed in consultation with fisheries agencies; (3) longitudinal graphs of model output showing temperature enhancements for each scenario downstream to the ocean; (4) presentation of comparable information on average impacts of each cold water release scenario; and (5) solicitation of fishery agency judgment on the significance of the estimated enhancements.

Response: We recognize that any form of controlling temperatures to improve conditions below Iron Gate dam can involve complicated combinations and coordination of release valves, timing, temperatures, flows, and targets. Our independent analysis concludes that temperature remediation should be pursued; however, we also consider it just as important to protect the functions of the Iron Gate Hatchery which relies on the cold water pool within Iron Gate reservoir to rear fish. To balance the competing needs for cold water stored in Iron Gate reservoir, we are recommending cold water releases only be made in emergency situations and that cold water is preserved for the hatchery while other fish passage measures are implemented and monitored. We conclude the cost of losing fish stock raised at the hatchery is too high for marginal temperature differences in the river during an experimental phase of fish passage. Measures identified by the EPA could be evaluated under recommendations that we made in the draft EIS and this EIS, but because implementation of temperature remediation measures would entail environmental trade-offs, we consider it most appropriate for resource agencies to be involved in making such resource management decisions.

WQL-40 Comment: The Water Board (p. 5) states that to the extent possible, the EIS should document how the proposed project would impact beneficial uses on a yearly, monthly, daily, and hourly basis. DO results should be compared to applicable regulatory criteria and the relevant data presented in comprehensive tables and figures.

Response: To better characterize the conditions relative to temperature, DO, and pH, we have supplemented section 3.2.2 of the EIS with new figures showing hourly continuous data that readily can be compared to the state water quality standards (objectives in California) shown in table 3-24 of the draft EIS. The effects of project-related water quality on various designated beneficial uses (that do not necessarily have numerical criteria) are found in the various resource sections that pertain to such uses.

WQL-41 Comment: NMFS (p 21) and Cal Fish & Game (pp. 8 and 9) comment that the EIS should incorporate the fact that nutrients originate from reservoirs in some months. NMFS and Cal Fish & Game state that the EIS should also consider the impacts of flow manipulation as well as reservoir storage on water quality. Finally, the cost-benefit component of the analysis should include the cost of not achieving water quality improvements.

Response: Regarding NMFS and Cal Fish & Game comments that the EIS should incorporate the fact that nutrients originate from reservoirs in some months, we discuss this on pages 3-147 and 3-148 of the draft EIS. Lines 12-14 of the latter page state: "We conclude…that Copco and Iron Gate reservoirs act as sources of inorganic nitrogen during the summer…" Our draft EIS does consider the effects of flow manipulation and reservoir storage on water quality. Project-related effects are identified in various subsections of section 3.3.2.1.2, *Water Quality, Affected Environment*, and measures to address those effects are discussed in various subsections of 3.3.2.2.2, *Water Quality, Environmental Effects*, and Aquatic Resources sections 3.3.3.2.1, *Instream Flows*, 3.3.3.2.2, *Fish Passage*, 3.3.3.2.3, *Disease*

Management, 3.3.3.2.4, *Dam Removal or Decommissioning*, and 3.3.3.2.5, *Anadromous Fish Restoration*. We updated each of these sections to reflect comments and new information received in response to the issuance of the draft EIS. Where we identify project-related effects on water quality, we either establish frameworks under which solutions to those problems can be developed, or specify environmental measures that we recommend be implemented by PacifiCorp. We fully expect water quality enhancements to result from our recommended measures. Water quality monitoring would document the degree of enhancement achieved, and whether additional measures need to be considered to further enhance water quality. We do not consider the cost of not achieving expected water quality enhancements to be relevant to our analysis, because we anticipate that all feasible measures would be implemented to address project-related water quality effects.

WQL-42 Comment: Quartz Valley Indian Reservation (pp. 15-18 and 31), Karuk Tribe, Yurok Tribe (pp. 23-26 and 33), Resighini Rancheria (pp. 15-18 and 31), and Klamath Riverkeeper et al. (p. 16) agree with our conclusion on page 3-148 of the draft EIS that project reservoirs can act as both nutrient sources and sinks, depending on the time of year and provide additional information further supporting this conclusion. Our statement on page 3-147, lines 22-25, that data in table 3-29 of the draft EIS could be used to support PacifiCorp's position that project reservoirs act as nutrient sinks, but "…concentration data alone are not enough to irrefutably support PacifiCorp's position" is not decisive enough in the opinion of Klamath Riverkeeper et al. (pp. 11 and 12), Quartz Valley Indian Reservation (p. 31), Karuk Tribe, Yurok Tribe (pp. 32 and 33), and Resighini Rancheria (p. 31). Table 3-29 in the draft EIS does not show nutrient data from upstream of Copco reservoir, it lumps data from several years which can be misleading, masking differences between years, and does not provide information about the mass of nutrients accumulating, the effect on the river, the source of those increased nutrient concentrations, or their ultimate fate. Therefore, table 3-29 offers only weak support for PacifiCorp's position. Reviews of PacifiCorp's nutrient modeling by Asarian and Kann (2006) lead the Klamath Riverkeeper et al., Quartz Valley Indian Reservation, Karuk Tribe, and Resighini Rancheria to conclude that PacifiCorp's modeling results do not agree with observed data and under-predict nutrient concentrations in the river directly below project reservoirs.

Response: Regarding the nutrient data presented in table 3-29 of the draft EIS, we supplement this discussion in this EIS to include longitudinal as well as flow weighted loading aspects to enhance the readers' understanding of nutrients in the Klamath River and project area. As far as PacifiCorp's modeling results relative to understanding the proposed project, we do not make any conclusions or determinations on the fate of nutrients or their concentrations in great detail given the limitations of the model's ability to accurately predict the complex chemical interactions within the river.

WQL-43 Comment: PacifiCorp (pp. 3-18 to 3-20), commenting on our use of Kann and Asarian (2005) and Campbell (1999) in our discussion of *Project-wide Water Quality Management* on pages 3-146 to 3-149 of the draft EIS to support our conclusion that at times, project reservoirs act as both nutrient sources and sinks, states that both studies were flawed, and presents their basis for reaching this conclusion. PacifiCorp appends its own report, *Causes and Effects of Nutrient Conditions in the Upper Klamath River*, which evaluates further the positive benefits of project reservoirs purported by PacifiCorp.

Response: PacifiCorp (2006d) primarily contains critiques of studies by Kann and Asarian (2005) and Asarian and Kann (2006) that indicate that although the project reservoirs (primarily Copco and Iron Gate) may act as net sinks of nutrients on an annual basis, there are times during the summer and early fall when Copco and Iron Gate reservoirs act as a source of nutrients to the Klamath River downstream of Iron Gate dam. PacifiCorp's critiques of these studies is rebutted by Kier Associates (2007). The role of Copco and Iron Gate reservoirs in downstream Klamath River nutrient dynamics is further addressed by Kann and Asarian (2007), based on a relatively intense, year-long data collection program from May 2005 through May 2006. Based on our review of all of these reports, there seems to be little disagreement

that on an annual basis, the project reservoirs act as nutrient sinks. However, we conclude from the evidence presented in these reports that there are times during the summer and fall when Copco and Iron Gate reservoirs act as nutrient sources. Kann and Asarian (2007) found that during 2005-2006, the frequency of alternating source/sink periods was not as apparent as they reported for 2002 (Kann and Asarian, 2005) and nitrogen concentrations were consistently lower in water downstream of Iron Gate dam compared to water entering Copco reservoir (unlike what they found in data collected in 2002). Kann and Asarian (2007) also addressed the potential for nitrogen fixation in Copco and Iron Gate reservoirs during blue-green algal blooms by quantifying the abundance of heterocysts (cells that fix nitrogen) relative to vegetative cells. The results of this analysis confirm the potential for nitrogen fixation in project reservoirs. Kann and Asarian (2007) acknowledge that additional study is warranted to assess the basis for the difference in nutrient retention in project reservoirs between years, as well as the factors that control those differences. Sponsors of many studies pertaining to nutrient dynamics of the Klamath River, including PacifiCorp, have pointed out the complexity and relative uniqueness of the system, which introduces uncertainties regarding evaluating and predicting the role of project operations and reservoirs in the water quality within and downstream of the project. We base our assessment on the available information, but recognize that all such information has limitations.

WQL-44 Comment: PacifiCorp (p. 3-9) states that *Aphanizomenon* is likely not a substantial source of nitrogen in project reservoirs. Although this algae is prevalent in project reservoirs during the summer, ample concentrations of $NO3^-$ and $NH4^+$ are nearly always available, which would preclude the need for nitrogen fixation.

Response: The ratio of nitrogen to phosphorus in the water column is an indication of which nutrient is limiting algal growth in a waterbody (EPA, 2000b). When the molar ratio of nitrogen to phosphorus is higher than 16, a waterbody is likely phosphorus-limited; conversely, when the ratio is less than 16, a waterbody is likely nitrogen-limited (Tetra Tech, 2004b). The Klamath River is generally recognized as nitrogen-limited (PacifiCorp, 2004a). The Hoopa Valley Tribe (Hoopa, 2006) queried the TMDL water quality database and concludes that with a summer mean of 13.9, the ratios of total nitrogen to total phosphorus indicate that the Klamath River is likely nitrogen-limited. Ratios of total inorganic nitrogen to orthophosphorus, the forms of nutrients immediately available for algal growth, show an even stronger nitrogen limitation with a summer mean of 8.1. During June through September conditions within project reservoirs are conducive to large algae blooms, as the water is warm, there is ample sunlight for photosynthesis, and the water entering project reservoirs is high in both phosphorus and nitrogen; however, as the algae bloom occurs, the growth rate of the algae is still dictated by the principle that there is some limiting factor, which in the case of the Klamath River is nitrogen. Nitrogen fixation is an energy intensive process; however regardless of the concentrations of nitrate and ammonia in the reservoirs, nitrogen is still the limiting nutrient during algae blooms thereby nitrogen fixation is expected to continue within the reservoir. In addition to nitrogen fixation by *Aphanizomenon*, the project reservoirs experience summertime hypolimnetic anoxia (common in productive lakes) which tends to release ammonia and orthophosphate (internal nutrient loading) which can exacerbate eutrophication and algal blooms. Kann and Asarian (2007) report that increases in heterocyst abundance of nitrogen fixing blue-green algae and the ratio of heterocysts to vegetative cells in Copco and Iron Gate reservoirs indicate the potential for nitrogen fixation in both reservoirs.

WQL-45 Comment: PacifiCorp (p. 3-22) objects to our use of the phrase "project-related nutrient enrichment" in our assessment of cumulative effects on page 3-157, lines 25 and 26. PacifiCorp states that our statement implies that the project adds nutrient loads to the system, which PacifiCorp denies.

Response: Based on our review of PacifiCorp's comments on the draft EIS, as well as new information filed by others, we continue to conclude that the project adds nutrient loads downstream of Iron Gate dam

at certain times of the year. This project-related nutrient enrichment is more pronounced in some years (e.g., 2002) than in others (e.g., 2005).

WQL-46 Comment: Oregon Fish & Wildlife (p. 83), the Water Board (p. 5), Klamath Riverkeeper et al. (p. 15), Quartz Valley Indian Reservation (pp. 10-15 and 34), Karuk Tribe, Yurok Tribe (pp. 19-23,36, and 39, and Resighini Rancheria (pp. 10-15 and 34) comment that the draft EIS failed to recognize the impacts of peaking/bypass operations on downstream water quality primarily because peaking/bypass operations interfere with the growth of attached algae, reducing the river's ability to remove nutrients from the water column as it flows downstream. The tribes and Klamath Riverkeeper et al. also comment that the section of the draft EIS on dam removal to enhance water quality, as well as section 5.2.21, *Dam Removal*, should also include the effects of bypassed reach and peaking operations on downstream water quality, because these effects would cease with removal of J.C. Boyle dam. Quartz Valley Indian Reservation (pp. 40 and 41), Karuk Tribe, Yurok Tribe (p. 39), and Resighini Rancheria also state that section 5.2.5, *Instream Flows*, should be revised to acknowledge the important influence of project flows in the J.C. Boyle bypassed, J.C. Boyle peaking, and Copco No. 2 bypassed reaches on downstream water quality. Quartz Valley Indian Reservation, Karuk Tribe, Yurok Tribe, and Resighini Rancheria agree with our statement in section 5.2.21 of the draft EIS that Iron Gate and Copco No. 1 dams have greater effects on water quality, but disagree that this should be used as justification for leaving J.C. Boyle and Copco No. 2 dams in place.

Response: We enhanced our discussion of the effects of project operations on the peaking and bypassed reaches in section 3.3.2.2.2 of this EIS. Regarding the tribes' comment that we should not use the greater effects on water quality at Iron Gate and Copco No. 1 dams as a reason to keep J.C. Boyle and Copco No. 2 dams in place, we conclude that because both reservoirs do not stratify and water in them has a short residence time, they have minimal effects on water quality and their removal would not result in appreciable changes in downstream water quality (as we indicate on page 3-153 of the draft EIS).

WQL-47 Comment: EPA (p. 4) notes that in the draft EIS, we state that DO concentrations in the peaking reach at flows from 370 to 2,400 cfs meet applicable state water quality criteria without describing the basis for this statement. On page 3-140 of the draft EIS, we state that there is no evidence that run-of-river operation would result in increased DO levels, but EPA comments that we provide no supporting information. EPA recommends that the EIS include documentation to support these statements, such as measurement plots, model output plots, or specific citations.

Response: We revised our position relative to DO concentrations in the peaking reach below 1,000 cfs and provide a new figure (figure 3-34) in section 3.3.2.1.2 that shows both flow and DO concentrations in the peaking reach at river mile 217 during peaking operations in August 2002. Flow during this time measured at the USGS gage no. 11510700 varied between 400 and 1,600 cfs, while DO concentrations cycled between a high of 7 mg/l and almost 11 mg/L. Readings below 7 mg/L (the California instantaneous water quality objective) were recorded for several hours; however, this occurrence was likely due to probe fouling based on the drift in recorded data visible in figure 3-34 in this EIS. Regarding the comment that the draft EIS lacks information on page 3-140 to support the statement that there is no evidence that run-of-river operation would result in increased DO levels, we direct the readers' attention to the existing conditions, summarized on page 3-140, lines 36-41. Low DO levels in project reservoirs are likely the result of high BOD in the water column, not from peaking and re-regulating operations. Operating in run-of-river mode would not change the intake depth; water passed downstream would originate from the same location as under existing conditions which would result in DO levels that are similar to the existing regime.

WQL-48 Comment: On page 3-143, line 14, of the draft EIS, we state: "There are no federal or California regulatory guidelines for cyanobacteria and their toxins." Quartz Valley Indian Reservation (p.

9), Karuk Tribe, and Resighini Rancheria (p. 9) state that this ignores the Hoopa Valley Tribe's recently adopted criteria for *Microcystis*. The tribes suggest that we change our statement as follows: "The state of California and federal agencies have not yet adopted regulatory guidelines for cyanobacteria and their toxins, but the Hoopa Valley Tribe (recently granted "Treatment as a State" status) has adopted criteria for *Microcystis aeruginosa* and microcystin for the Klamath River on the Hoopa Valley Indian Reservation. For recreational waters, the Hoopa criteria are a *Microcystis aeruginosa* cell density <50,000 cells/ml and <10 micrograms/L total microcystins."

Response: We modified the indicated text in this EIS to reflect this information.

WQL-49 Comment: Quartz Valley Indian Reservation (p. 6), Karuk Tribe, Yurok Tribe (p. 16), and Resighini Rancheria (p. 6) state that the EIS should be re-written to explicitly acknowledge that Iron Gate and Copco reservoirs increase the risk of, and are the principal contributors to *Microcystis* re-growth downstream, because the reservoirs provide ideal habitat for algal blooms. This increased inoculum enables *Microcystis* blooms to readily become established downstream, such as in a backwater area near Coon Creek, 100 miles downstream of Iron Gate dam (1.3 million cells/mL).

Response: We reviewed the most recent information related to the distribution of *Microcystis* throughout the Klamath River and have revised this EIS to include recent sampling results that show the presence of *Microcystis* well below Iron Gate reservoir. We recognize that although the initial *Microcystis* "seed" could have come from non-project-related sources (e.g., Upper Klamath Lake, Lake Shastina, Trinity Lake), conditions within Copco and Iron Gate reservoirs support algae blooms, and at least a portion of the *Microcystis* found at downstream locations are likely originating from them. We now recommend monitoring of *Microcystis* and its toxin at locations downstream of Iron Gate dam as well as several major tributaries that would provide data on the source of elevated downstream microcystin concentrations and the entities that should take primary roles in implementing subsequent monitoring and assessment of potential corrective actions.

WQL-50 Comment: Josh Strange (p. 9), Quartz Valley Indian Reservation (pp. 6 and 7), Karuk Tribe, Yurok Tribe (pp. 16 and 17), and Resighini Rancheria (pp. 6 and 7), commenting on page 3-144, lines 14-16, of the draft EIS, strongly disagree with our implication that Upper Klamath Lake is the necessary "seed" source for *Microcystis* blooms in project reservoirs. *Microcystis* colonies overwinter in the bottom sediments of lakes and reservoirs and serve as new infective colonies when habitat conditions are appropriate. *Microcystis* densities during the algal growing season are typically far higher in Copco and Iron Gate reservoirs compared to the outlet of Upper Klamath Lake or the peaking reach. *Microcystis* populations in project reservoirs would occur even in the absence of inoculant from Upper Klamath Lake. Mr. Strange points out that recent monitoring of inflow to Copco reservoir during 2006 found no *Microcystis* cells.

Response: Recent sampling data alone is not sufficient to prove or disprove the absence of inoculant from Upper Klamath Lake; however, we suggest the more important debate should focus on answering the question of what, if anything, can be done about it now that we know it exists in Copco, Iron Gate, and select locations upstream and downstream and that the microcystin concentrations are high enough to warrant public health warnings. See our response to the previous comment.

WQL-51 Comment: Quartz Valley Indian Reservation (pp. 7-9), Karuk Tribe, Yurok Tribe (pp. 17 and 18), and Resighini Rancheria (pp. 7-9) state that pages 3-143 and 3-144 of the draft EIS incorrectly state that 2005 was the first documented *Microcystis* bloom in the Klamath River downstream of Upper Klamath Lake. PacifiCorp detected *Microcystis* in its 2001-2004 phytoplankton sampling program, but did not report it to public health agencies. Kann and Corum (2006) also document cell densities of 1.9

million cells/mL in Copco reservoir on September 29, 2004. The tribes provide suggested alternative text for both specified pages.

Response: We did not state on pages 3-143 and 3-144 of the draft EIS that 2005 was the first documented *Microcystis* bloom in the Klamath River downstream of Upper Klamath Lake. On page 3-143, lines 8-13, we disclose that during 2005 and 2006 there were substantial and sustained blooms of *Microcystis* in Copco and Iron Gate reservoirs, and the nature of these blooms triggered the first health advisories issued by public agencies. On page 3-144, lines 11-14, we note that in the absence of a structured monitoring program, previous occurrences in the mainstem Klamath River to its mouth and of the nature of those documented in 2005 and 2006 in project reservoirs (i.e., substantial and sustained) may have been undetected. We note on page 3-117, lines 5-8, of the draft EIS, that a *Microcystis* bloom had been detected in September 2004 in Copco reservoir. The 2004 bloom did not trigger any health advisories. We modified the text of section 3.3.2.2.2 in this EIS to clarify that 2005 was not the first documented occurrence of *Microcystis* in project reservoirs.

WQL-52 Comment: Interior (p. 71), NMFS (p. 62), Oregon Fish & Wildlife (p. 82), EPA (p. 6), Yurok Tribe (pp. 14-16), Quartz Valley Indian Reservation (pp. 5 and 6), Karuk Tribe, and Resighini Rancheria (pp. 5 and 6) state that the EIS should adequately analyze monitoring for *Microcystis* for all reservoir and river reaches affected by the project, including within and between Copco and Iron Gate reservoirs and downstream of Iron Gate dam at locations where elevated toxin or algae levels have been detected by prior studies. Quartz Valley Indian Reservation, Karuk Tribe, and Resighini Rancheria note that although cell counts generally follow a decreasing trend as the river flows from Iron Gate to the estuary, cell counts are still high based on information provided in Kann (2006) and Fetcho (2006), and the highest counts were detected in mid-September, during the fall Chinook salmon migration period. Monitoring and warning notices during high cell-count periods could result in the loss of all or most of the fishing season, which would be devastating to tribal subsistence and commercial fisheries. PacifiCorp should be required to monitor to the mouth of the Klamath River and the EIS should acknowledge the downstream extent of high *Microcystis* concentrations and the attendant consequences for human and fish health (the Yurok Tribe found microcystin in adult steelhead that had only been in the river a short time). Monitoring alone is an inadequate response by Commission staff to the project-driven *Microcystis* problem. Similarly, Klamath Riverkeeper et al. (pp. 14 and 15) states that although *Microcystis* is the most important issue associated with project dams, it only is mentioned in a few sentences and the proposed mitigation is monitoring. The draft EIS ignores the fact that the project is creating and releasing a known toxin which is a serious health issue, has serious cumulative effects, and violates state water quality objectives and the Hoopa Valley tribal standard. It demands a supplemental analysis of this issue that includes all available information, including that which has not yet been disclosed by PacifiCorp (as indicated on page 3-118, lines 11-12, of the draft EIS). The analysis should include an economic analysis that assesses the impacts raised by the tribes and should recognize that toxic algae is at its zenith during tribal ceremonies that are integrally related to use of Klamath River water. Josh Strange (p. 9) similarly recommends monitoring for *Microcystis* to the mouth of the river and also states that PacifiCorp should be required to take any safe and effective action to solve the problem. He comments that there are substantial costs (both societal and economic) associated with not being able to use the water in the project reservoirs and downstream of Iron Gate dam as a result of microcystin originating from project reservoirs.

Response: We now recommend *Microcystis* monitoring to the mouth of the Klamath River, based on our review of information provided in response to the draft EIS. Our recommendation call for monitoring throughout the river and its major tributaries for a limited amount of time, after which the results would be analyzed and the need for additional river-wide monitoring determined. We describe our analysis supporting this recommendation in section 3.3.3.2.3, *Disease Management*, of this EIS. Blooms of *Microcystis* are becoming increasingly prevalent in reservoirs and natural lakes on a nation-wide basis

and methods to control such blooms beyond controlling nutrient levels in susceptible waterbodies may be identified as further research is conducted. See our responses to the previous two comments.

WQL-53 Comment: The Ad Hoc Committee (p. 1) states that posting warning signs regarding the presence of toxic algae at project reservoirs is not enough; the reservoirs should be fenced off and declared off-limits to the public until the dams are removed.

Response: The Commission is charged with ensuring safe and reasonable public access to project lands and waters Our understanding of microcystin as an environmental toxin is growing, but is still incomplete, as are procedures for determining and responding to its potential health risks. We note that comments filed by homeowners whose properties abut Copco and Iron Gate reservoirs indicate that they have not experienced or heard of anyone suffering ill effects following contact with reservoir water. A study to examine whether recreational use of Copco and Iron Gate reservoirs leads to detectable levels of microcystin in nasal secretions or blood of participants is planned for the summer of 2007 (Harris, 2007).

WQL-54 Comment: EPA (p. 6) comments that in addition to monitoring for *Microcystis* in Copco and Iron Gate reservoirs, as we recommend in measure 6S in the draft EIS, and downstream of the project to the mouth of the Klamath River (which we did not recommend) this measure should be expanded into a cyanobacterial management plan that includes monitoring and management measures such as: (1) monitoring for other species of blue-green algae or cyanobacteria and their toxins that are likely to be found in project reservoirs and downstream to the mouth of the river; (2) analysis and implementation of measures for preventing or minimizing occurrences of blooms by managing controllable factors that may promote bloom conditions such as increased nutrient loadings, temperatures, and turbidity, greater residence time, and reduced vertical mixing (in conjunction with a comprehensive water quality management plan); and (3) analysis and implementation of options for controlling blooms and minimizing public health exposures when they do occur.

Response: In recognition of recent sampling results reported since the draft EIS was released, we modified the text in section 3.2.2 and now recognize that *Microcystis* was found as far down river as the estuary. As such, we also modified the Staff Alternative in this EIS to include monitoring in the main stem of the Klamath at six locations below Iron Gate dam as part of an integrated fish passage and disease management program discussed in detail in sections 3.3.3.2.5 and 5.2.6, *Anadromous Fish Restoration,* of this EIS. As for implementing measures to minimize occurrences or factors that contribute to *Microcystis* blooms, our recommended comprehensive water quality management plan, with a focus on nutrient removal, would be the appropriate forum to accomplish this. Nutrient removal could include the development of treatment wetlands, harvesting algae, or using biological processes (e.g., floating aquatic plants) to sequester nutrients which are later harvested and made available for other markets. However, nutrient removal techniques often involve environmental trade-offs, and we therefore consider it appropriate for resource agencies to provide input on the specific measures that would be implemented. We have revised our recommendation in this EIS to establish specific time lines for such consultation to take place, and for implementation of specific measures agreed to during the consultation. Our recommended monitoring plan includes measures for reporting to the appropriate public health agencies so they can notify the public should microcystin concentrations be determined to threaten public safety, thereby potentially minimizing public exposure.

WQL-55 Comment: The Karuk Tribe (p. 7) states that the draft EIS fails to address the impacts of algal toxins on Karuk subsistence fishermen that practice dip net fishing at Ishi Pishi Falls. These fishermen come into contact with the water and breath water vapor as it passes over the falls. The EIS should recommend a testing program to assess the effects of microcystin exposure on traditional fishermen.

Response: We recognize that the toxin microcystin was recorded within the project area and downstream to the estuary at levels that caused the Water Board to issue public health warnings to minimize contact with the water. Microcystin has been documented to bioaccumulate, so risk associated with contact or ingestion of microcystin would be expected to be higher among subsistence fishermen than casual fishermen or other recreation activities that involve contact with Klamath River water. The development of water quality standards typically considers the various risks involved and the likelihood these risks could be realized. We recommend that water quality be sampled at six mainstem Klamath River locations and public health agencies be notified and provide notice to the public in the event that waters exceed the risk to the public (currently most of the literature revolves around the World Health Organization values). Educating the public as to when a *Microcystis* bloom is occurring would minimize the risk of exposure, precluding the need to test affected individuals. A study to examine whether recreational use of Copco and Iron Gate reservoirs leads to detectable levels of microcystin in the nasal secretions or blood of participants is planned for the summer of 2007 (Harris, 2007) and its results may be applicable, to some extent, to downstream traditional fishermen.

WQL-56 Comment: Interior (p. 71) and NMFS (p. 62) state that our EIS analysis needs to include *in situ* studies on the impacts of toxins from *M. aeruginosa* (microcystins) on fish and other aquatic biota of the Klamath River. Josh Strange (p.10) comments that the draft EIS does not discuss the severity of the threat of *Microcystis* to the public downstream of Iron Gate dam or the risks to aquatic resources. He asks us to assess the effects of microcystin, which damages the liver of the already challenged immune function of fish due to high water temperature and disease pathogens.

Response: *Microcystis* and its toxin are found in waterbodies throughout the world and we do not consider it appropriate for PacifiCorp to be responsible for conducting a research program to define the specific effects of microcystin on fish and aquatic biota of the Klamath River. It is clear that microcystin is an undesirable environmental element and we consider it appropriate for PacifiCorp to be required to take all reasonable actions to control project-related conditions that would foster *Microcystis* blooms (and other algal blooms) in project reservoirs. Implementation of our recommended comprehensive water quality management plan would ensure such actions are taken by PacifiCorp. The severity of the threat of *Microcystis* to the public and aquatic resources downstream of Iron Gate dam is currently unknown.

WQL-57 Comment: Oregon Fish & Wildlife (p. 82) comments that our recommendation should require PacifiCorp to manage reservoir flows and water quality as a proactive reservoir issue to address the issue of *Microcystis* blooms and not rely on other entities such as counties for notification of public safety.

Response: Given the implications of public use and associated health ramifications of exposure to microcystin, we consider it inappropriate for PacifiCorp to issue any public health warnings or advisories concerning the results of project-related microcystin monitoring. However, we agree that provisions for prompt notification of agencies that are charged with issuing such public health notifications is essential and have added development of such protocols to our recommended *Microcystis* and microcystin monitoring program described in section 5.1.1.2 of this EIS. Our recommendations in this EIS that pertain to measures that would enhance water quality by operational and other specific techniques are intended to be proactive.

WQL-58 Comment: EPA (p. 6) states that the EIS should consider how PacifiCorp could work with the appropriate entities to provide public health advisory postings at project reservoir public access sites when algae cell counts or toxin levels exceed pre-identified threshold levels. Such posting measures could be included as an element of the recommended recreational resource management plan.

Response: We agree with EPA that if and when agencies issue public health advisories regarding *Microcystis* or microcystin presence in project waters, it would be appropriate for PacifiCorp to post such

advisories or warnings at public access points to project waters, and have modified our recommended measure for *Microcystis* and microcystin monitoring in section 5.1.1.2 accordingly.

WQL-59 Comment: In response to our recommendation to develop a monitoring plan to identify *Microcystis* algae blooms, PacifiCorp (pp. 3-18 and 5-5) notes that in March 2006, PacifiCorp committed to a 3-year study, funded at $150,000 a year, to evaluate the cause and management of blue-green algae (which would include *Microcystis*) in the Klamath Basin. As part of this study, a workgroup has formed that includes state, federal, tribal, county, and general public stakeholders. PacifiCorp believes this is the proper venue to address blue-green algae concerns in the basin, in addition to PacifiCorp's proposed reservoir management plans and the Klamath River TMDL process.

Response: PacifiCorp's funding of a basin-wide study to evaluate the causes and management of blue-green algae is commendable. We agree that environmental measures implemented under a water quality management plan would be the most appropriate means to address and minimize project-related conditions that foster algal blooms, including *Microcystis*, in project reservoirs. However, we continue to conclude that PacifiCorp should be responsible for monitoring *Microcystis* and microcystin presence in project-affected waters because the existence of project reservoirs creates conditions that favor algal growth, and prompt notification of public health authorities is in the best interest of protecting the public that uses such water. See our responses to the previous two comments.

WQL-60 Comment: Quartz Valley Indian Reservation (pp. 30 and 31), Karuk Tribe, Yurok Tribe (p. 32), and Resighini Rancheria (pp. 30 and 31) agree with our conclusions on the relationship between *C. shasta* and *Cladophora* on pages 3-143 to 3-145, and point out that our citation of "Stocking (2006, as cited by Resighini Rancheria, 2006)" on these pages can now be changed to "Stocking (2006)" since Stocking's master's thesis is now complete and available for review on the Internet.
Response: We have reviewed Stocking's finalized masters thesis and updated our in-text citations and literature cited section accordingly.

WQL-61 Comment: EPA (p. 3) states that the components of our recommended single, comprehensive water quality management plan described on page 5-2 (measure 4P) appear to primarily focus on improving DO conditions in the discharge of waters from Iron Gate dam. EPA recommends that the plan include consideration of measures to improve DO levels throughout all layers of Copco and Iron Gate reservoirs to meet water quality standards. EPA also recommends that the plan address the other significant water quality concerns in the reservoirs, such as elevated temperatures, nutrient levels, and pH, as well as potential mitigation.

Response: Our description of our recommended comprehensive water quality management plan on page 5-2 is meant to be a brief summary of the measure. We provide more details on the expected content of the plan in section 5.2.4 of the draft EIS and we indicate that the focus of the plan would be on temperature, DO, and nutrient enrichment issues primarily associated with Copco and Iron Gate reservoirs. Project-related nutrient enrichment would result in pH problems and by addressing enrichment; PacifiCorp would also be addressing pH. Our analysis of potential approaches to DO enhancement on pages 3-140 to 3-143 of the draft EIS includes measures that would enhance DO at both Copco and Iron Gate reservoirs, as well as downstream of Iron Gate dam. We added additional details to section 5.2.4 of this EIS regarding measures that we expect to be included in the water quality management plan.

WQL-62 Comment: In response to our recommendation that PacifiCorp develop a single, comprehensive water quality management plan for all project-affected waters, rather than three separate reservoir management plans, PacifiCorp (pp. 2-3 and 5-4) states that a single plan may not be appropriate or practical, because the project lies in two separate states with different water quality objectives for

reservoirs and riverine reaches. PacifiCorp suggests that the three separate plans that it proposes in its water quality certification applications be completed, so that format, activities, and schedules are synchronized and consistent.

Response: We recognize that water quality objectives in Oregon and California are different, but the overall beneficial uses supported in both states are similar and we do not see this as a barrier to developing a single comprehensive water quality management plan. We consider water quality from the upstream to the downstream end of the project to be inter-related, and consider PacifiCorp's goal of achieving consistent and synchronized format, activities, and schedules to be excellent reasons to develop a single plan rather than three separate plans.

WQL-63 Comment: Oregon Fish & Wildlife (p. 82) states that in our recommendation to develop a cooperative water quality plan we identified 12 potential measures to treat algae. We should fully evaluate the environmental consequences of this alternative, and provide a comparison of impacts and/or benefits to the other alternatives. Any plan should result in a known outcome, since a plan alone does not ensure that results will be achieved, but may only serve to defer decision making. Similarly, the Forest Service (p. 2) states that although we developed a fairly comprehensive range of future water quality improvement plans in the draft EIS, these plans should specify quantitative outcomes and associated timelines. Similarly, Pacific Coast Federation of Fishermen's Associations et al. (pp. 43 and 44) states that although many project-related impacts on water quality were identified in the draft EIS, the Staff Alternative does not cure any of these impacts but only advocates for a water quality management plan with a goal of mitigating these problems in some unspecified way in the future. There is no certainty that the unspecified measures would be successful or any indication of the consequences if the measures are not successful and the project cannot meet water quality standards. The EIS should identify specific measures, standards and goals which the water quality management plan is intended to achieve, and the consequences of not achieving those standards and goals. Poor water quality throughout the project would be remedied with a four dam removal alternative.

Response: We do not identify 12 potential measures to treat project-related algae in the draft EIS, although we do suggest several control measures that could be considered. In preparation for developing our draft EIS, we requested that PacifiCorp respond to various additional information requests related to specific measures that could be implemented to address water quality problems such as temperature and DO. Specific measures that were put forward by PacifiCorp to address DO problems, including hypolimnetic oxygenation and use of algaecide to control blooms have been questioned or rejected by many entities. Given the disagreement over techniques that would likely be effective for addressing project-related water quality issues, our approach in the draft EIS is to recommend that PacifiCorp consult with appropriate resource agencies to develop specific measures that PacifiCorp would implement, while recommending that PacifiCorp proceed with specific measures that our analysis show could be implemented promptly without unintended adverse effects on other resources or water quality parameters. We make this clear on page 5-26, lines 5- 17, of the draft EIS, and recommend development of a water temperature management plan that provides specific protocols for releasing cool hypolimnetic water during emergency circumstances and immediate implementation of turbine venting at the Iron Gate powerhouse, while additional DO enhancement measures are evaluated. Addressing issues related to nutrient loading is likely to require complex solutions because these issues represent cumulative effects related to upstream nutrient input and processes that occur in project reservoirs; and cooperative solutions between PacifiCorp and upstream water users are likely to be necessary. However, in this EIS we clarify specific measures that we expect to be implemented, timeframes for implementation, and adaptive approaches that we recommend be implemented if our recommended water quality monitoring reveals that following implementation of specific measures, water quality remains impaired.

WQL-64 Comment: Quartz Valley Indian Reservation (p. 40), Karuk Tribe, Yurok Tribe (p. 38), and Resighini Rancheria (p. 40) comment that given our characterization of the project impacts to water quality and fish disease, it is disappointing that the only explicitly required measure recommended in the Staff Alternative to address these problems is turbine venting. It is uncertain whether this measure would enable water released from Iron Gate dam to meet applicable water quality standards for DO. However, at best, this measure would only improve water quality in the vicinity of the dam. Most DO problems in the Klamath River are caused by excessive growths of attached algae and rooted aquatic macrophytes that cover large portions of the river, hence oxygenation at a single point would be largely ineffective and do nothing to mitigate for the project's many impacts to water quality and fish disease. Piecemeal actions such as turbine venting, hypolimnetic aeration, and algaecide application are, as yet, untested. Removal of the four mainstem dams is the only way to eliminate the project's impacts to water quality.

Response: Please see our response to the previous comment. Our recommendation to promptly implement turbine venting is based on concerns raised by other parties regarding other potential specific solutions to existing project-related water quality problems. We note that turbine venting, hypolimnetic oxygenation, and algaecide application have been used effectively throughout the country to address site-specific water quality problems and they are not untested. Turbine venting was recommended as an interim measure while other effective means to enhance DO, such as hypolimnetic oxygenation and controlled spillage during critical periods are evaluated for potential unintended consequences. Acquisition of data in response to turbine venting would provide clear direction on the need for additional measures. Although we now agree that algaecide is likely an inappropriate treatment for project reservoirs, other options are potentially available; and we include several such measures in this EIS. We expect that even with removal of the four mainstem dams, there would still be excessive growths of attached algae and rooted aquatic macrophytes covering large portions of the river because of nutrient inflow from upstream sources (although such growth may be displaced upstream from current locations downstream of Iron Gate dam). As we state on page 3-150, lines 19-20, of the draft EIS: "However, we expect considerable effort to be expended to identify all options to correct the problem (meaning project-related water quality problems) before decommissioning is considered." Efforts such as these to address project-related water quality issues have not yet been expended.

WQL-65 Comment: Margaret Draper (p. 4), Laura Smith (p. 2), and the Klamath Basin Audubon Society (p. 2) state that our recommended "solution" to water quality problems in the Klamath River of pumping supplemental oxygen into pools to help stressed overheated fish survive is a band-aid approach that does not address the ecosystem ills at the root nor does it address factors that cause toxic algae or diseases that kill juvenile salmon in the river. Current watershed management results in chemical pollution, too little water, and too much heat in the water and these issues need to be addressed at a fundamental causation level.

Response: Our practice is to require a licensee to implement environmental measures that are project-related and over which it has control. Management of the Klamath River watershed is the responsibility of resource agencies. Addressing the fundamental causation level of ecosystem ills beyond those measures that can be attributed to the project is currently being addressed through the TMDL process and Reclamation's proposed CIP program. Please see our responses to the previous two comments.

WQL-66 Comment: The Water Board (p. 6) states that without specific details regarding PacifiCorp's proposed reservoir management plans, it is impossible to determine at this time if the plans would result in measurable improvements to water quality. Therefore, the draft EIS does not evaluate impacts, benefits, or costs of reservoir management measures. For example, one potential method of controlling algae offered by PacifiCorp is the use of copper sulphate, which can cause fish kills, accumulation of copper in sediments, and decreased DO in reservoirs from decomposing algae. The draft EIS does not evaluate these potential impacts and the final EIS should fully evaluate the environmental consequences

of using copper sulphate to control algae, and provide a comparison of impacts and benefits to other alternatives. Such analysis of the water quality impacts of implementing proposed plans would ensure that proposed plans do not serve to defer decision making. Northcoast Environmental Center (p. 1) also indicates that the EIS should identify the adverse environmental impacts of using algaecides. Similarly, Quartz Valley Indian Reservation (pp. 9 and 10), Karuk Tribe, Yurok Tribe (p. 33), and Resighini Rancheria (pp. 9 and 10) state that our EIS should recognize that the use of algaecides on *Microcystis* causes the cells to lyse, thus releasing microcystin in one large pulse. Therefore, the use of algaecides to control *Microcystis* blooms is not reasonable. In addition, the tribes state that our EIS should discuss the implications of using copper sulphate on water quality. Quartz Valley Indian Reservation (p. 32), Karuk Tribe, Yurok Tribe (p. 33), Resighini Rancheria (p. 32), and Klamath Riverkeeper et al. (p. 12) suggest that we replace the sentence on lines 2-3, of page 3-149, of the draft EIS "…depending on the algaecide used, there could be associated adverse water quality effects" with "…applying algaecide is known to cause release of cell-bound microcystin toxin into the water column, and depending on the algaecide used, there could be other associated adverse toxicity effects." EPA (p. 6) recommends that our EIS consider that *Microcystis* releases its toxin during cell death and, thus, use of algaecides such as copper sulfate could increase public health risks by increasing microcystin levels. Josh Strange (p. 9) states that using copper sulphate, a poison in project reservoirs to control production of another poison, microcystin, is doomed to cause additional problems without solving the target project. There is no discussion in the draft EIS of the environmental impacts associated with copper sulphate which include: killing invertebrates; exacerbating algal growth; creating resistant strains of cyanobacteria; creating toxic sediments; liver toxicity; toxicity to fish; and the fact that it is potential mutagen, carcinogen, and teratogen. *Microcystis* control can only be achieved by decommissioning the project, according to Mr. Strange.

Response: As the Water Board indicates, the content of PacifiCorp's proposed reservoir management plans have yet to be developed, making it impossible to evaluate the effects of the details of such plans. PacifiCorp indicates some potential measures the plans could contain, including controlling algae, which could include use of an algaecide. Because the details of the plans have yet to be unveiled, we recommend that final reservoir management plans include measures for scientific experimentation including the exploration of the use of aquatic plants to help reduce nutrient concentrations as well as specific time lines for implementation of specific measures to enhance water quality. The reservoir management plan should be developed within 1 year of license issuance in consultation with the EPA, NMFS, FWS, Interior, Forest Service, Reclamation, Water Board, NCRWQCB, Cal Fish & Game, Oregon Fish & Wildlife, Oregon Environmental Quality, and Conservation Groups and implemented within the first 3 months after Commission approval. We now conclude that application of algaecides, such as copper sulphate, to project reservoirs is not a viable option when *Microcystis* is present and modified section 3.3.2.2.2, Water Quality, of this EIS accordingly. We also no longer suggest that algaecides that would lyse cells and release microcystin to the environment (as copper sulphate would) be considered during development of our recommended comprehensive water quality management plan and have made this clear in section 5.2.4 of this EIS.

WQL-67 Comment: The city of Yreka (p. 3) states that minimum flow recommendations for Fall Creek could have unintended negative consequences for temperature and DO. During hot weather, the release of additional flows at Fall Creek may introduce waters warmer than a 5 degree differential for the natural receiving water temperature. In addition, Fall Creek easily meets the DO objectives, but allowing a 40 percent increase in flow could supersaturate the water with DO, as temperatures rise during the summer.

Response: We conclude that the release of an additional 4.5 cfs to the Fall Creek bypassed reach over the existing minimum flow (0.5 cfs) would not result in negative consequences to the waters in the natural channel or violation of the state water quality objectives. Fall Creek originates from a headwater spring and is heavily shaded, thus any additional water released to the bypassed reach would likely be cooler

than would be present under existing conditions. The increased volume of water in the bypassed reach would not be warmed as readily when air temperatures are warmer than the water temperature compared to current conditions. We are aware of no evidence that increasing flows in the Fall Creek bypassed reach could potentially lead to DO supersaturation.

WQL-68 Comment: Humboldt County (p. 3) states that the draft EIS does not provide a demonstration of how Oregon and California water quality standards would be met. California is in the process of developing TMDL standards for temperature, DO, and sediment in the Klamath River and the project must be capable of meeting those objectives. The Commission should consult with the North Coast Regional Water Quality Control Board, state Water Board, and California Department of Water Resources to identify appropriate water quality and quantity improvement activities.

Response: This licensing proceeding has involved the three indicated agencies and numerous others, and many environmental measures have been identified. The Commission cannot issue a new license for this project unless Oregon Environmental Quality and the Water Board either issue water quality certificates for this project or both waive their authority to do so. We can recommend that PacifiCorp consult with Oregon Environmental Quality and the Water Board during the development of our recommended comprehensive water quality management plan, and we include such consultation in this EIS.

WQL-69 Comment: The Forest Service (p. 2) states that none of the alternatives that retain all facilities are likely to meet state water quality objectives for DO during the summer for reaches downstream of Copco and Iron Gate reservoirs. This is because DO in both reservoirs at a depth of 40 feet is between 1.1 and 4.9 mg/L during the summer and turbine venting alone would increase DO by only 2.2 to 2.7 mg/L, which would still not reach the minimum of 8 mg/L objective in the Basin Plan. The Forest Service recommends that measures, in addition to the Staff-recommended turbine injection at Copco No. 1 and Iron Gate dams and coordinated spillage at Iron Gate, be explored to enhance the river's natural aeration capacity.

Response: The intakes to the Copco No. 1 powerhouse are at a depth of about 30 feet and Iron Gate powerhouse at a depth of about 36 feet, as we indicated on page 3-105 of the draft EIS. Vertical monthly profiles taken Copco reservoir indicate that a depth of 30 feet, DO concentrations ranged from 4.7 to 6.8 mg/L from June through September 2002. At a depth of 36 feet in Iron Gate reservoir, DO ranged from 0.5 mg/L in September to 6.1 mg/L in June. However, as figure 3-24 in the draft EIS indicates, water that passes through Iron Gate powerhouse is drawn from an average depth of 10 feet from Iron Gate reservoir, where the DO is typically above 8 mg/L (see figure 3-28 of the draft EIS). Consequently, we indicate on page 3-142 of the draft EIS that although intended as a short term measure to enhance DO to a point where it consistently meets Basin Plan objectives, it may also serve as a long term solution to DO issues downstream of Iron Gate dam. This would not preclude evaluation and implementation of other measures to further enhance DO in both Copco and Iron Gate reservoirs and such measures would be included in an adaptive program based on monitoring results.

WQL-70 Comment: On page 5-1 and 5-2 of the draft EIS, we modify PacifiCorp's proposed measure "3P" to install a hypolimnetic oxygenation system in Iron Gate reservoir by delaying its implementation until potential adverse effects are evaluated. EPA (p. 3) recommends that the EIS discuss potential adverse impacts of a reservoir oxygenation system on DO within the reservoir as well as potential mitigation.

Response: Our recommendation to delay implementation of hypolimnetic oxygenation in Iron Gate reservoir was in response to recommendations to that effect by NMFS, FWS, and the Forest Service, as we indicated on page 3-140 of the draft EIS. We discussed potential adverse effects of hypolimnetic oxygenation on pages 3-141, lines 32-49, and 3-141, lines 1-2, of the draft EIS. We do not expect there to

be any adverse effects on DO within the reservoir from implementation of hypolimnetic oxygenation; potential adverse effects are associated with possible elimination of reservoir stratification, thus eliminating a potential source of cool-water releases during emergency downstream conditions, and nutrients bound to bottom sediments that would likely re-enter the water column under aerobic conditions. NMFS, FWS, and the Forest Service all recommended further study of this proposed measure to minimize the potential for unwanted effects and we agree that such additional study would be prudent.

WQL-71 Comment: PacifiCorp (pp. 2-3, 3-17, and 5-4), commenting on our analysis on page 3-142 and modification to its proposed measure 3P, described on page 2-45, lines 7-10, of the draft EIS, that would require implementation and monitoring of turbine venting at the Iron Gate development, states that turbine venting could increase the amount of total dissolved gas, possibly beyond state regulatory limits. PacifiCorp suggests that field tests of air flow, DO uptake, and total dissolved gas would be needed before permanent turbine air venting modifications are made.

Response: We recognize the turbine venting has the potential to increase total dissolved gases to unacceptable levels and have added text to section 3.3.2.2.2, *Water Quality*, that reflects this possibility. On page 3-142, lines 8-15, of the draft EIS, we indicate that monitoring initial turbine venting results would determine whether it represents a viable long term solution to downstream DO problems, and we would not expect permanent turbine air venting modifications to be made until it is clear that continued turbine venting during periods of low DO would be effective. As noted in table 3-24 of the draft EIS, California has no specific standards regarding total dissolved gases. However, if gas supersaturation is sufficient to increase incidences of gas bubble trauma in fish populations downstream of Iron Gate dam, this would likely be viewed by the Water Board as an impairment of designated beneficial uses associated with fish habitat. Consequently, we have revised our recommended measure to ensure that total dissolved gases are included in water quality monitoring associated with initial turbine venting implementation.

WQL-72 Comment: PacifiCorp (pp. 2-3, 3-16, 3-17, and 5-4), in response to our recommendation to delay its proposed implementation of a hypolimnetic oxygenation system at Iron Gate reservoir, still concludes that this technique would be effective for enhancing DO conditions in the reservoir and in dam releases. PacifiCorp notes that such systems can be designed to achieve target DO levels and prevent undesirable or unanticipated secondary effects. PacifiCorp proposes to retain this approach on the short list of measures to be assessed as part of its proposed reservoir management plan. The Forest Service (p. 2) agrees with our conclusion that hypolimnetic oxygenation might degrade other water quality parameters and that it needs further study.

Response: We agree that hypolimnetic oxygenation should be retained as an option for increasing project-related DO levels to meet applicable water quality objectives and recognize that hypolimnetic oxygenation systems have been effectively implemented elsewhere in the country. However, we consider it prudent to investigate whether or not unintended adverse temperature or increased nutrient availability could result from use of this system prior to expending more than $2 million in capital costs to install such a system.

WQL-73 Comment: EPA (p. 4) states that one of the key water quality issues for this project is low DO in the deepest parts of each reservoir. EPA comments that although we propose the use of reservoir aeration to address this impact, we also raise concern about the potential breakdown of the thermocline and reduction in volume of cold water in the hypolimnion if reservoir aeration is implemented. EPA notes that the draft EIS provides no examples where such DO impacts were successfully mitigated by reservoir aeration and where thermocline breakdown due to aeration has occurred, and requests that the EIS include examples of literature describing successful implementation of this technology to improve hypolimnetic DO and where aeration has led to the breakdown of the thermocline.

Response: Gantzer (2002), based on researching an air diffuser system in a deep seasonally stratified lake in Virginia, reports that the hypolimnion was observed to move upward during oxygenation; however, the purpose of mentioning concerns about the potential breakdown of the thermocline is to disclose all potential effects surrounding such a measure and the need to consider and balance the need for cold clean water at the fish hatchery with oxygenated water below Iron Gate dam. Air injection and hypolimnetic oxygenation systems are used in various ways throughout the world and in some cases, the objective is to de-stratify the water column by injecting air forcefully enough to cause the layers to mix. We recognize this is not the objective of PacifiCorp's proposal; however, we conclude that the prudent approach is to implement measures that can be effective in improving conditions almost immediately (e.g., turbine venting), while a more comprehensive approach and understanding of potential consequences emerges. Our recommended comprehensive water quality management plan is the proper forum for this kind of evaluation and could include the objectives of the oxygenation system (to aerate waters passed downstream or to aerate the bottom waters to assist in the overall control of internal nutrient loading). Oxygen injection at Iron Gate that is selectively directed to the area in front of the intakes is an option that has already been considered by PacifiCorp and its consultant and may warrant further consideration.

WQL-74 Comment: PacifiCorp (pp. 3-16, 3-36, and 5-7), commenting on our analysis of potential measures to cool Klamath River water downstream of Iron Gate dam during the summer, agrees that using the cold water pool in Iron Gate reservoir for such purpose would exhaust the sole source of cold water for the Iron Gate Hatchery, as we note on page 3-138 of the draft EIS, and also notes that once used, the cold water pool in Iron Gate reservoir would not be replenished until the following winter-spring season.

Response: We recognize that use of cool, hypolimnetic water from Iron Gate reservoir would have some adverse ramifications to the ecosystem in the reservoir and the primary source of coldwater for the Iron Gate Hatchery, as we pointed out on page 3-138 of the draft EIS. Our recognition of these necessary environmental trade-offs was the basis for our recommended development of protocols for implementation of any such coolwater releases when conditions for downstream salmonid survival approach critical levels. Appropriate resource agencies and tribes would be consulted during protocol development, so that environmental trade-offs can be appropriately weighed.

WQL-75 Comment: Interior (p. 95) and NMFS (p. 62) comment that our description of measures 2P and 3P on page 5-1 of the draft EIS, which details our modification of PacifiCorp's proposed measures to release cool, oxygenated water from Iron Gate dam, should require similar provisions at Copco No. 1 dam.

Response: In our draft EIS, we took an adaptive approach to enhancing water quality and this is reflected in our modifications to PacifiCorp's reservoir management plans shown on page 5-2, lines 7-19. Two such adaptive measures would be consideration of spillage and turbine venting at Copco Nos. 1 and 2 developments to enhance DO in Iron Gate reservoir and potentially, downstream of Iron Gate dam, as specified on lines 11-15. We assessed the benefits of releasing hypolimnetic cool water from Copco reservoir on pages 3-136 and 3-137 of the draft EIS and concluded that there would be limited potential for meaningful downstream temperature relief from releasing such water in tandem with releases from Iron Gate reservoir. Given that hypolimnetic releases from Iron Gate reservoir would only occur under extreme circumstances, as we indicate in the previous comment response, the incremental benefit of less than an additional 2 days of minimal temperature relief that could be achieved from releases of Copco reservoir hypolimnetic releases does not warrant the resultant ecosystem effect on Copco reservoir (i.e., elimination of the available coolwater hypolimnetic pool until the following year would likely restrict or prevent use of this reservoir by salmonids during the summer).

WQL-76 Comment: On page 3-157 of our discussion of unavoidable adverse effects we state: "The project, as proposed, would continue to affect temperatures in the Klamath River." Quartz Valley Indian Reservation (p. 35), Karuk Tribe, Yurok Tribe (pp. 36 and 38), and Resighini Rancheria (p. 35) all agree that the project results in unmitigatable impacts to water temperature in the Klamath River, and this sentence should be strengthened to recognize the project's adverse impacts on fall Chinook salmon spawning and incubation.

Response: The referenced sentence is in section 3.3.2.4, *Water Resources, Unavoidable Adverse Effects*. We recognize the unavoidable adverse effects related to project-related water quality on Chinook salmon in section 3.3.3.4, *Aquatic Resources, Unavoidable Adverse Effects*, on page 3-312, lines 42-44, of the draft EIS. We note that many parties that commented on the draft EIS point out that Chinook salmon are remarkably tolerant of relatively high water temperatures.

WQL-77 Comment: In our discussion of unavoidable adverse effects on page 3-157, we state "…even with implementation of best management practices that may be developed as part of a project-wide water quality management plan, it is likely that algal blooms would continue to occur in project reservoirs, albeit at a smaller scale and less frequently…" Quartz Valley Indian Reservation (p. 35), Karuk Tribe, Yurok Tribe (p. 36), and Resighini Rancheria (p. 35) suggest that we add language to this statement regarding the toxic algae *Microcystis*.

Response: Our existing statement would cover the expected continued presence of all algae, including *Microcystis*, in project reservoirs even with best management practices. We consider the text that precedes this statement in the EIS sufficiently describes the known adverse effects of microcystin, although implementation of best management practices may be sufficient to control blooms of this species to the level where associated potential adverse effects do
not occur.

WQL-78 Comment: PacifiCorp (p. 3-21), commenting on page 3-149, lines 24-28, of the draft EIS, states that there is no specific evidence that project operations have contributed to taste and odor effects on the flesh of harvestable fish and other aquatic resources in the Klamath River. PacifiCorp concludes that negative perceptions of water quality by recreational users are caused by impaired water quality conditions flowing into the project from upstream sources and that project reservoirs enhance water quality, as indicated by a general trend of increasing transparency in the downstream direction through the project area.

Response: On page 3-149, lines 29-30, of the draft EIS we state that we "…have no specific information regarding what specific conditions are causing taste and odor complaints by recreational users, but given the prevalence of algal blooms in project reservoirs, we suspect that such blooms are the likely cause of taste and odor problems." We also suggest that conditions that would allow hydrogen sulfide production (high organic matter and anoxic conditions) are present when Copco and Iron Gate reservoirs stratify during the summer and this could also contribute to taste and odor problems if hydrogen sulfide is present in areas inhabited by fish. However, in recognition of PacifiCorp's statement that there is no specific evidence that project operations have contributed to taste and odor effects on the flesh of harvestable fish and other aquatic resources in the Klamath River, we modified the sentence that was on page 3-149, lines 24-26, of the draft EIS, to the following: "Project operations contribute to water quality conditions that *may* (emphasis added) affect the taste and odor of project waters and could affect the flesh of harvestable salmonids and other aquatic resources that occur within the river."

WQL-79 Comment: The Water Board (p. 6) states that the draft EIS acknowledges that there are waters of the Klamath River with objectionable taste and odor. These problems affect the recreational use of the river, limit the consumptive use of the water, and may impact the taste of fish flesh. The Water Board

comments that blue-green algae are the most likely cause of taste and odor problems in the water and fish of the Klamath River. Additional studies should be conducted to determine the impact of the alternatives on taste and odor problems in the Klamath River. The EIS should fully disclose the impact of the alternatives on taste and odor problems.

Response: We point out on page 3-149, lines 29-32, of the draft EIS, that although we have no information regarding what specific conditions are causing taste and odor complaints by recreational users in the project area, it is most likely associated with algal blooms in project reservoirs, as the Water Board suggests. All four action alternatives analyzed in the draft EIS contained measures that would reduce the likelihood of algal blooms in project reservoirs and enhance water quality. We would expect such enhancements to reduce or eliminate any project-related taste and odors. Table 5-1 in the draft EIS compares expected water quality effects associated with all four alternatives in general terms, but without information regarding the specific cause, predicting whether existing taste and odor problems in the Klamath River would decrease under any project alternative is not possible. We recommend that water quality monitoring be included as an element of any comprehensive water quality management plan that is included in a new license, and such monitoring could target identification of the source of the perceived taste and odor problems. We consider it more productive to implement measures that would address the likely causes of such problems.

WQL-80 Comment: PacifiCorp (pp. 3-21, 3-22, 3-42, 3-43, and 5-2) commenting on our analysis of dam removal to enhance water quality on pages 3-150 to 3-153 and sections 3.3.3.2.4, *Dam Removal or Decommissioning*, and 5.1.1.4, *Retirement of Copco No. 1 and Iron Gate Developments with Staff Measures*, of the draft EIS, agrees with our conclusion that the Klamath River without dams would still experience high levels of nutrients and organic matter, and that water quality conditions in the river would continue to be impaired. However, PacifiCorp does not agree that the geographical extent of river impairment would be reduced with mainstem dam removal, but concludes that impairment would be extended with mainstem dam removal. Without the dams, nutrient rich water would travel faster and farther through the river system which would extend the range of attached periphytic algae like *Cladophora* further downstream. PacifiCorp also concludes that if nutrient assimilation processes begin closer to upriver sources with dam removal, as we suggest on page 3-151, lines 40-44, of the draft EIS, this would mean that attached periphytic algae would increase substantially in abundance and distribution upstream, compared to existing conditions.

Response: We added text to section 3.3.2.2.2, *Dam Removal to Enhance Water Quality* regarding nutrient assimilation and uptake potential within the Klamath River. We acknowledge that there is some uncertainty regarding the degree to which downstream water quality would be enhanced with dam removal. Based on the evidence we have seen so far, we conclude that dam removal would lead to enhanced riverine water quality. A displacement of periphytic algae to upstream locations, as we suggest may occur in the draft EIS, would not necessarily equate to an increase in abundance or an expansion of the current distribution. We now recommend reservoir drawdowns during the third year from license issuance to address critical uncertainties pertaining to fish passage and anadromous fish restoration (see section 3.3.3.2.5 and 5.2.6, *Anadromous Fish Restoration*, of this EIS). Although intended to address project operational measures that could enhance fish passage and control fish pathogens, water quality monitoring before and during this drawdown could enable data to be gathered to address the likely distribution of periphyton with and without Copco and Iron Gate reservoirs.

WQL-81 Comment: On page 3-150 of the draft EIS in our discussion of dam removal to enhance water quality we state: "If water quality objectives are not met for reasons that aren't related to project operations (e.g., the quality of water entering the development is similar to the quality of water leaving the development), it would be inappropriate to consider decommissioning the development." Quartz Valley Indian Reservation (p. 32), Karuk Tribe, Yurok Tribe (pp. 33-35), Resighini Rancheria (p. 32), and Klamath Riverkeeper et al. (pp. 12 and 13) strongly disagree with this statement as worded. Although

they agree that PacifiCorp should not be held responsible for problems not related to the project, analysis of the quality of water entering the development compared to the quality of water leaving the development is an incomplete way to assess the effects of the project on water quality. For example, groundwater accretion in the J.C. Boyle bypassed reach could make it appear that water quality leaving the J.C. Boyle development is better than that entering J.C. Boyle reservoir, but the effects of the project would be masked by factors unrelated to the project. The true measure of the project effect on water quality is the comparison of current conditions at Iron Gate dam with the conditions that would exist at Iron Gate dam without the project.

Response: We note there is no readily available source of water quality data downstream of Iron Gate dam for without project conditions (which is not our analytical comparative baseline). As many commenters have pointed out, although computer modeling can be used to simulate flows and temperatures accurately under various scenarios, modeling of other parameters is less reliable and, although a useful tool, would certainly not be sufficient to form the basis of such a major decision as decommissioning a project development. However, the quality of water entering and leaving a development can readily be measured. We recognize that in some instances, such as the J.C. Boyle bypassed reach, caution regarding interpretation of results would need to be applied to avoid the appearance that water quality exiting the development is either enhanced or degraded by passage through the development when such is not the case. We modified the text to indicate that any such analysis of water leaving a development would need to consider data from a point where mixing and appropriate analysis could be applied to ensure such localized effects as those that occur in the J.C. Boyle bypassed reach are considered.

WQL-82 Comment: Quartz Valley Indian Reservation (p. 34), Karuk Tribe, Yurok Tribe (p. 35), and Resighini Rancheria (p. 34) comment that our citation of "Biggs (2000, as cited by Resighini Rancheria, 2006)" on page 3-151, line 17, of the draft EIS, in our discussion of dam removal to enhance water quality, can be changed to Biggs (2000) since the original document was filed under accession number 20060328-5082.

Response: The indicated text of the EIS has been updated

WQL-83 Comment: On page 3-153 of the draft EIS we state: "Without Copco and Iron Gate, temperatures below Iron Gate would experience more diurnal variability than existing conditions; however this variability would not be as extreme as without project scenario predictions." Conservation Groups (p. 10) state that this mischaracterizes the effect of dam removal on water temperature in the fall. PacifiCorp's modeling shows that water temperature decreased by as much as 5 degrees C or more below Iron Gate during late summer and fall without dams and this decreased temperature was also evident at the Shasta River confluence.

Response: PacifiCorp's modeling does show that water temperatures decrease by as much as 5°C or more below Iron Gate during the late summer and fall without the dams, as figure 3-37 of the draft EIS shows, and this decreased temperature is also evident down to the confluence with the Shasta River. However, the text questioned by Conservation Groups is intended to indicate that when compared to existing conditions and conditions that would exist without all four mainstem project dams (the without project scenario), removal of two of the four project dams would increase diurnal temperature variability over existing conditions, but not as much as with a four dam removal scenario. In this EIS, we added text that further addresses temperature effects under a four dam removal scenario.

WQL-84 Comment: Quartz Valley Indian Reservation (p. 34), Karuk Tribe, Yurok Tribe (pp. 35 and 36), and Resighini Rancheria (p. 34) suggest that we add the following sentence to our discussion of potential water quality enhancements with removal of J.C. Boyle dam on page 3-153, lines 2-13: "In

October, 2004, PacifiCorp detected *Microcystis aeruginosa* at its site below J.C. Boyle dam during a year when it was not detected at sites upstream between Link River and above J.C. Boyle reservoir, indicating that J.C. Boyle Reservoir was the likely source of the *Microcystis*. Hence, removal of J.C. Boyle Dam could reduce the amount of *Microcystis* above Copco Reservoir."

Response: We do not consider it appropriate to speculate whether the J.C. Boyle reservoir was the likely source of *Microcystis* found downstream of J.C. Boyle dam and, therefore, decline to add the tribes' unsupported statement to the EIS. The tribes point out in their comments that *Microcystis* has been found 190 miles downstream of Iron Gate dam, and if this occurrence is related to project operations, it seems similarly possible that *Microcystis* found downstream of J.C. Boyle dam could have originated from a variety of upstream sources, including those upstream of J.C. Boyle reservoir. We note that water in J.C. Boyle reservoir typically does not stratify and has a relatively short residence time, thus conditions for algal blooms related to this reservoir are not as favorable as those in Copco and Iron Gate reservoirs.

WQL-85 Comment: On page 3-157 of the draft EIS we state: "…we expect the adverse effects from increased turbidity during and following dam removal to range from relatively short-term, minimal increases in turbidity, to increases in turbidity that could last for several years." Conservation Groups (p. 10) point out that the California Coastal Conservancy study estimates that if all four dams are removed, turbidity would increase over a period of less than 120 days. It is unreasonable to expect turbidity to increase for several years, as we state in the draft EIS. We should conduct a supplemental analysis that considers the most recent estimates of increased turbidity.

Response: We included relevant information contained in the California Coastal Conservancy sediment characterization study in section 3.3.2.2 of this EIS and modified section 3.3.2.4, *Unavoidable Adverse Effects* accordingly. The California Coastal Conservancy study (GEC, 2006) assumed that Copco No. 1 and Iron Gate dams are removed simultaneously, which would minimize the duration of periods of initial high turbidity associated with suspended sediments. However, if dams are removed sequentially, the period of high turbidity would last substantially longer. This period could last for several years if there is at least 1 year between dam removals, as would occur under the dam removal scenario that we explore. If exposed sediments after the initial reservoir draining are not stabilized by vegetation or other means in a timely manner, high flow of precipitation events could result in erosion of fine-grained sediment into the active river channel, increasing downstream turbidity. This threat could continue indefinitely until such exposed sediments are stabilized, which could take years to effectively achieve.

WQL-86 Comment: Josh Strange (p. 8) states that characterization of reservoir and possible contaminants is a critical component of determining the feasibility of decommissioning project dams, but the draft EIS only discusses PacifiCorp's surface sediment studies and not the coring studies conducted by the California Coastal Conservancy that show encouraging results in terms of low contaminant levels and workable sediment volumes. There is no excuse for not at least stating that this critically important study was underway.

Response: On page 5-58, lines 18-21, of the draft EIS, we state the following: "We currently have no information that would indicate whether or not the sediments in either reservoir (meaning Copco and Iron Gate reservoirs) would be contaminated to the extent of requiring dredging and upland disposal, but sampling being conducted by the California State Coastal Conservancy should provide information on contaminant levels prior to issuance of the final EIS." We have incorporated the results of the new study (GEC, 2006) in this EIS in section 3.3.1. We state on page 4-4 of the draft EIS that our base costs for dam removal assumed sediments in project reservoirs were not contaminated. Consequently, although the more comprehensive sediment analysis data is useful, and supports our draft EIS assumption, it would not have changed any of our conclusions in the draft EIS.

WQL-87 Comment: North Coast Consumer's Alliance (p. 1) states that removal of the project dams is necessary, but asks us to investigate methods to ensure that cold, clean water can be delivered to the river reaches below the dams during dam removal.

Response: Providing cold clean water to downstream reaches during dam removal would not be feasible. Project reservoirs would be drawn down prior to dam removal, but this could result in warmer water being released from late spring to early summer, as figure 3-37 in the draft EIS indicates in the "without project" plot. As indicated in PacifiCorp's earlier sediment sampling and confirmed in the more recent studies sponsored by the California Coastal Conservancy (GEC, 2006), much of the sediments in Copco and Iron Gate reservoirs consists of silt and clay and would be readily resuspended during dam removal. Relatively high amounts of total suspended solids would persist for about 120 days following dam removal, and GEC (2006) presents different options for addressing this relatively short-term water quality degradation to various downstream water users. The most effective option for avoiding adverse effects on migrating anadromous fish would be to time dam removals and associated sediment releases to occur when key life stages are not in the river.

WQL-88 Comment: The city of Yreka (p. 3) states that increased flows in Fall Creek could facilitate additional sediment transport to Iron Gate reservoir with negative impacts to the quality of the city's water supply and to the Klamath River fisheries if the dam is removed.

Response: There is no evidence in the record that fine-grained sediment that could influence water quality at the city's intake is stored behind the Fall Creek diversion dam and our on-site observations confirm that there is little or no sediment in Fall Creek that would be susceptible to resuspension. An increase in minimum flows in the Fall Creek bypassed reach or even removal of the Fall Creek diversion dam would not change the net flow of Fall Creek downstream of the tailrace channel confluence.

WQL-89 Comment: Quartz Valley Indian Reservation (p. 39), Karuk Tribe, Yurok Tribe (p. 37), and Resighini Rancheria (p. 39) state that table 5-1 in the draft EIS, which summarizes the effects of four action alternatives, should be revised to include language regarding how the various alternatives affect taste and odor compounds, pH, and ammonia. In addition, this table should indicate that the Retirement of Copco No. 1 and Iron Gate Developments Alternative would nearly eliminate the *Microcystis* problem in the lower Klamath River, and this oversight requires correction.

Response: We consider water quality issues pertaining to taste and odor compounds, pH, and ammonia to all relate to nutrient loading and the interaction of such loading with project reservoirs. The effects of all four action alternatives on nutrient loading are summarized in table 5-1 of the draft EIS. We modified table 5-1 to indicate that alternatives that entail dam removal options would reduce the abundance of *Microcystis* and its toxin downstream of Iron Gate. We are not prepared to say that dam removal would nearly eliminate *Microcystis* downstream of Iron Gate, without supporting evidence that *Microcystis* from upstream of the project or from tributaries of the Klamath River would not continue to adversely affect the lower Klamath River.

WQL-90 Comment: Joyce King (p. 2) indicates that the draft EIS does not address the cumulative effects of future harvest plans of large timberland owners, which are increasing harvest rates and shortening rotations by offering untested mitigations for erosion and channel spreading.

Response: In the draft EIS we address the cumulative effects of past and future timber harvesting in the Klamath River Basin on page 3-157, lines 8-16, and on page 3-311, lines 10-11.

AQUATIC RESOURCES

Affected Environment

A-1 Comment: PacifiCorp (pp. 3-22 and 3-24), commenting on footnote 44 on page 3-158, and text on page 3-225, lines 20-24, of the draft EIS, states that, although it may have been true that rainbow trout below Upper Klamath Lake were predominantly of coastal origin prior to the construction of the mainstem dams, it is not true today. Resident trout between Upper Klamath Lake and Iron Gate dam are now considered redband (interior) trout, not coastal trout.

Response: We modified this EIS to reflect this information. Because some genetic mixing between the subspecies is likely to occur and the ancestry of specific populations cannot be determined without genetic testing, we refer to the resident form of both subspecies as rainbow trout, and the anadromous form as steelhead.

A-2 Comment: PacifiCorp (p. 3-22), commenting on page 3-165, line 29, of the draft EIS, states that the 2002 FWS BiOp obligated PacifiCorp to develop a plan to operate the East Side and West Side powerhouses to minimize entrainment of suckers. In response, PacifiCorp agreed to shut down the West Side powerhouse from July 27 through October 17 and limit night-time operation of the East Side powerhouse to 200 cfs (the minimum turbine operation) during this period. Studies show that sucker entrainment occurs primarily at night.

Response: Our review of available flow and generation data for East Side and West Side powerhouses for the period of record (which extended until March 2005) shows that, in general, PacifiCorp operates these two developments in accordance with its operational agreement. Some exceptions have occurred, however. For example, generation at the West Side powerhouse in early August 2003 conflicted with the 2002 FWS BiOp, and night-time generation at the East Side powerhouse was in excess of the minimum turbine capacity during the nights of August 26 through 28, 2004. We added text to this EIS to indicate that PacifiCorp has been operating the East Side and West Side powerhouses during the vast majority of the available generation records in accordance with the 2002 FWS BiOp.

A-3 Comment: Regarding our statement on page 3-169, lines 5-6, of the draft EIS, that "…water quality (in J.C. Boyle reservoir) is often degraded, particularly during the summer," Interior (p. 71) asks us to define "often" and "degraded" in regard to water quality, including the seasonal nature (summer months of the year) and variability of change in water quality.

Response: This description was based on PacifiCorp's characterization of J.C. Boyle reservoir in its license application, which notes that water discharged from the reservoir into the J.C. Boyle bypassed reach is quite warm, highly productive, and often degraded. Temperature data summarized in table 3-25 of the draft EIS indicate that average monthly water temperatures in J.C. Boyle reservoir are 21.9°C in July and 22.5°C in August. Water in J.C. Boyle reservoir, which does not stratify and has a short residence time (1.1 days, on average), is therefore indicative of water quality entering the reservoir.

A-4 Comment: Interior (pp. 66, 71) states that our EIS should describe the current condition and limited effectiveness of the J.C. Boyle fish ladder.

Response: On page 3-169, ,lines 23-30, of the draft EIS, we describe the initial, quite successful, and subsequent, not quite as successful, effectiveness of the J.C. Boyle fish ladder. We note on page 3-272, lines 20-23, that the existing J.C. Boyle fish ladder does not meet current agency criteria.

A-5 Comment: PacifiCorp (pp. 3-22, 3-37, and 3-38), commenting on pages 3-169, lines 23-30, and 3-272, lines 24-33, of the draft EIS, states that, although the J.C. Boyle fish ladder passed many trout when it was constructed in 1959 and much fewer when fish passage was last monitored in 1991, the ladder itself functions well. PacifiCorp comments that the most likely explanation for the declining use of the ladder is that the trout population has adapted over time to a more favorable strategy of remaining below the dam to spawn and rear. PacifiCorp modified the channel leading to the entrance of the fish ladder in September 2006 (details are provided on page 3-37 of PacifiCorp's comment letter) in response to Oregon Fish & Wildlife and FWS concerns that high water velocities in this channel could restrict upstream passage to the entrance to the fish ladder. PacifiCorp states that, if entrance channel conditions were the cause of declining use of the ladder, use of the ladder would now begin to increase.

Response: Our recommended integrated fish passage and disease management program would include monitoring upstream fish passage effectiveness to assess how effective the existing fish ladder is in passing resident and anadromous fish following the approach channel modifications that have already been implemented and the proposed modifications to the ladder. If the existing ladder proves to be effective, we see no need to replace it with a new ladder.

A-6 Comment: On page 3-197, lines 36-39, of the draft EIS, we state: "Hamilton et al. (2005) concluded, based on historical accounts and knowledge of the types of habitat preferred by the species, that coho salmon would probably have used Spencer Creek, and would have migrated upstream to at least this tributary, …" PacifiCorp (pp. 3-23 and 3-39) comments that Hamilton et al.'s conclusion is based on professional judgment and not on any known historical accounts and conflicts with other available information from Cal Fish & Game (2002).

Response: We modified the text in section 3.3.3.1.2, *Anadromous Fish Species*, to emphasize that the potential use of Spencer Creek by coho salmon is based on habitat preference, rather than on actual historical accounts.

A-7 Comment: PacifiCorp (p. 3-23) comments that, although table 3-50 in the draft EIS suggests coho salmon currently use some cool water refugia on the mainstem of the lower Klamath River, use of mainstem habitat for rearing is not a typical life history component of this species. PacifiCorp suggests that degraded lower basin tributary habitat is forcing juvenile coho salmon to rely on mainstem Klamath River habitat for completion of this life stage prior to smoltification. It states that juvenile outmigrant trapping data collected by Cal Fish & Game from the Shasta River also show that sub-yearling coho salmon move to the mainstem of the Klamath River during the spring.

Response: Although we concur that the downstream migration of coho salmon juveniles into the mainstem Klamath River may be related to degraded habitat conditions in tributaries, they may also return to tributaries after water temperatures become suitable.

A-8 Comment: PacifiCorp (pp. 3-22 and 3-23), commenting on pages 3-169, line 10; 3-173, line 15; and 3-176, line 12, of the draft EIS, states that PacifiCorp contracted with Oregon State University to conduct fish sampling in J.C. Boyle, Copco, and Iron Gate reservoirs, not Oregon Fish & Wildlife.

Response: We revised the text in this EIS accordingly.

A-9 Comment: On page 3-176, lines 33-35, of the draft EIS, we indicate that substantial populations of salmon and steelhead occur in the Shasta, Scott, Salmon, and Trinity rivers. PacifiCorp (p. 3-23) asks us to cite and discuss the references that support this statement because it is their understanding that the Shasta, Scott, and Salmon rivers are currently underseeded and our discussion on pages 3-183 to 3-189 of the draft EIS describes the current anadromous fish populations in these rivers as declining.

Response: We modified the text to indicate that most stocks of anadromous fish in these tributaries have declined substantially from historic levels.

A-10 Comment: On page 3-193, lines 24-31, of the draft EIS, we discuss the contributions of hatchery fish to the annual escapement of fall Chinook salmon in the Klamath River Basin. PacifiCorp (p. 3-23) cites work by Hampton (2005) that indicates that 33 percent of the fall Chinook salmon spawning population in Bogus Creek is of hatchery origin. Using the average escapement values presented in table 3-47 of the draft EIS, PacifiCorp estimates that 3,124 of the 9,474 Chinook salmon escapement to Bogus Creek would originate from Iron Gate Hatchery. Adding this Bogus Creek escapement to the Iron Gate Hatchery escapement results in a total escapement of 21.7 percent (or 18,600 adults) of fall Chinook salmon production in the Klamath Basin. PacifiCorp uses this information to support its conclusion that alternatives that reduce or eliminate Iron Gate Hatchery production would substantially influence both production and harvest benefits.

Response: It is true that loss of hatchery production would likely have an immediate effect on fall Chinook salmon production in the Klamath River Basin. Therefore, we recommend any dam removal option include a provision for continuation of commensurate hatchery production until upstream populations are established. To maintain adequate water supply to Iron Gate Hatchery during this time period, any dam removal scenario should defer the removal of Iron Gate dam until a program to establish anadromous fish populations in upstream habitat has been initiated.

A-11 Comment: PacifiCorp (p. 3-24) clarifies our statement pertaining to yearling Chinook salmon rearing on page 3-206, lines 14-18, of the draft EIS. The yearling Chinook salmon production program was terminated only at the Fall Creek rearing facility (180,000 fish). Cal Fish & Game continues to maintain production of 900,000 yearling Chinook salmon at the Iron Gate Hatchery, although state funding for that program is not well secured from year to year.

Response: We clarified the text in section 3.3.3.1.3 to reflect that the yearling production at Iron Gate Hatchery continues to be funded by Cal Fish & Game and that funding decisions for this program are made annually.

A-12 Comment: PacifiCorp (p. 3-23), commenting on page 3-202, lines 17-23, in the draft EIS, states that the ALJ decision affirmed that it is inconclusive as to whether Pacific lamprey were historically present above Iron Gate dam.

Response: We have modified the text to reflect the ALJ's findings regarding the historical distribution of lamprey above Iron Gate dam.

A-13 Comment: Quartz Valley Indian Reservation (p. 32) states that section 3.3.3.1.4, *Diseases Affecting Salmon and Steelhead*, should mention the findings of Stocking (2006) regarding the distribution of the intermediate polychaete fish parasite host. These key findings are described on page 3-145 of the draft EIS.
Response: We incorporated the findings of Stocking (2006) in sections 3.3.3.1.4, *Diseases Affecting Salmon and Steelhead*, and 3.3.3.2.3, *Disease Management*, of this EIS**.**

Instream Flows

A-14 Comment: On page 3-231, lines 24-27, of the draft EIS, we conclude that increasing the minimum flow release at Link River dam would likely impede the restoration of anadromous fish to areas upstream of Link River dam if a smolt collection facility were constructed at East Side or West Side developments. PacifiCorp (p. 3-24) comments that this would not necessarily be the case, since the facility could be

designed to screen the minimum bypassed flow as well as the powerhouse flow and route all fish to a common collection facility. PacifiCorp comments that the cost of screening flows released from the dam would not be PacifiCorp's responsibility.

Response: We modified the text in section 3.3.3.2.1, *Instream Flows*, accordingly.

A-15 Comment: Interior (pp. 40-41) states that provisions for refilling Keno reservoir when it is drawn down must ensure maintenance of flows below Keno dam and lake elevations pursuant to Reclamation's contract with PacifiCorp.

Response: The only time Keno reservoir is drawn down is to allow irrigators and other water users to perform maintenance on the intakes to their pumps. Figure 3-7 in the draft EIS shows that such drawdowns are infrequent. If Keno development should remain in the project, our recommendations in section 5.2.19 of the draft EIS would ensure Keno reservoir is maintained consistent with the existing contract between PacifiCorp and Reclamation (as well as Reclamation's 4(e) conditions) and that provisions for refilling Keno reservoir following drawdowns in a manner that maintains flows in the Keno reach are specified in a project operations management plan.

A-16 Comment: PacifiCorp (p. 3-24), commenting on page 3-232, lines 42-44, of the draft EIS, notes that this sentence appears to suggest that new minimum flow and ramp rates should be considered at Keno dam. Any consideration of modifying the minimum releases or ramping rates at Keno dam must consider consequences on the primary purpose of Keno dam operations, which is to maintain stable pool levels for irrigation operations.

Response: If the Commission agrees with our conclusion that the Keno development currently does not serve project purposes and it is removed from the project, the Commission would have no authority to specify how the dam is operated. If Keno development should remain in the project, the Commission would have the authority to specify operations that balance the environmental benefits that would be accrued in the Keno reach with relatively stable releases from the dam with the benefits of maintaining stable reservoir water levels in the reservoir for irrigation. Our recommendations in section 5.2.19 of the EIS seek to achieve this balance.

A-17 Comment: Section 5.2.19, *Keno Development*, of the draft EIS specifies environmental measures that would be recommended if the Commission determines that Keno development should remain within the project, including provisions for flow releases at the dam. PacifiCorp (p. 5-14) states that controlling releases from Keno dam to within 10 percent of a 3-day running average, as we recommend, would be extremely difficult if not impossible, without similar constraints imposed on irrigation operations. In addition, implementation of this recommendation would require substantial enhancements to real-time instrumentation on all irrigation activities.

Response: If the Commission includes the Keno development in a new license, we recommend that the hourly releases from Keno dam be based on the 3-day running <u>daily</u> averages from the real-time Link River USGS gage no. 11507500 and various real-time and daily gages operated by Reclamation at the Lost River diversion channel, North canal, Klamath Straits drain, ADY canal, and others. We revised the wording of this measure, in this EIS, to clarify our intent that releases from Keno dam would be based on the 3-day running average of daily flows rather than a 3-day running average of instantaneous flows.

A-18 Comment: Interior (p. 95) and NMFS (p. 62) comment that our description of measure 1P on page 5-1 of the draft EIS, which recommends implementation of instream flows and ramp rates in project reaches to protect and/or enhance flow-dependent resources, should specify flows and ramp rates that accomplish these goals with sufficient analysis to support them.

Response: We provide an extensive analysis of instream flows and ramp rates in section 3.3.3.2.1, *Instream Flows*, of the draft EIS. We updated our analysis in this EIS based on comments and other information received since the issuance of the draft EIS. The flows and ramp rates that we recommend in this EIS would protect and enhance flow-dependent resources compared to existing conditions.

A-19 Comment: Interior (p. 71) requests that we provide current data that support the conclusion on page 3-235, lines 19 and 20, of the draft EIS, that the J.C. Boyle bypassed reach is one of the two most popular angling reaches between Link River and Iron Gate dams. Interior (p. 71) notes that the catch rates for the Keno, J.C. Boyle bypassed, and J.C. Boyle peaking reaches shown in table 3-59 of the draft EIS is over 20 years old and table 3-60 is from a PacifiCorp study that may not accurately represent recreational catch rate. Interior states that our EIS should include any recent catch rate data.

Response: We modified the text in section 3.3.3.2.1, *Instream Flows*, to note that the Keno, J.C. Boyle bypassed, and J.C. Boyle peaking reaches are the most popular angling reaches between Link River and Iron Gate dams. We also added a figure showing catch rate data comparing 2004 catch rates among 33 wild trout streams in California, which includes the California section of the J.C. Boyle peaking reach (shown as the Upper Klamath River).

A-20 Comment: PacifiCorp (p. 3-36) commented on page 3-246, line 7, of the draft EIS, where we report Cal Fish & Game catch information for the California portion of the peaking reach from a report issued in 2000. It comments that this angler catch rate data was updated by Cal Fish & Game in 2004, and showed that the Upper Klamath River has the highest catch rates among the 34 streams surveyed.

Response: We modified section 3.3.3.2.1, *Instream Flows*, to include this information. We note that statements where this information was referred to in the EPAct 2005 proceeding indicated that the data were from 33 streams, which matches the bar graph that was submitted as exhibit PAC-Ols-D-3, which we include in this EIS.

A-21 Comment: Interior (p.71) comments that our statement on page 3-239, lines 16-18, of the draft EIS, that catch rates reflect densities of trout should be removed. Catch rates do not reflect densities because they are subject to a great deal of variability (see Snedaker and Hooton rebuttal testimonies issue 3 from the hearing). NMFS (pp. 13 and 30) and the Hoopa Valley Tribe (pp. 25 and 26) similarly comment that the draft EIS improperly cites catch rates and fish densities as the only rationale for adequacy of existing and proposed flow regimes for the bypassed reaches, and does not analyze other relevant information that demonstrates impacts of project operations including low project flows.

Response: We removed the statement that high catch rates reported in the J.C. Boyle reaches reflect high densities of trout from this EIS. In the draft EIS, we acknowledge that the higher minimum flows and lower ramping rates recommended by the agencies and tribes would benefit trout populations in the J.C. Boyle peaking reach by minimizing the potential for stranding and by increasing the productivity of food-producing habitat along stream margins. However, we maintain that the flow measures proposed by PacifiCorp constitute a substantial improvement in habitat conditions in the J.C. Boyle peaking and bypassed reaches, and would be expected to sustain and enhance the existing high quality fisheries in these reaches. In this EIS, we include additional measures that would further restrict ramping rates in the peaking reach during the first several peaking cycles that follow any 7-day period of relatively stable flows, and we include provisions for monitoring fish stranding and implementing any additional restrictions that are warranted through adaptive management.

A-22 Comment: Oregon Fish & Wildlife (p. 81), Cal Fish & Game (pp. 9-12), and NMFS (p. 25) comment that the draft EIS downplays the ability of redband trout to thrive in warmer water between 16

and 19°C (Gard, 2006) and ignores negative temperature effects of lower discharges upstream of the springs in which temperatures enter a range of values 26.9°C that may cause acute mortality in some species. Even when using the lower general rainbow trout temperature optimums, Gard (2006) found that the compensating factor of increased drift and other factors would result in greater growth rates with the Bureau of Land Management prescribed discharge of 470 cfs rather than the 200 cfs recommended in the draft EIS, and states that the differences in growth would be even greater if the 19°C optimum for redband trout were used. Oregon Fish & Wildlife states that there appears to be no basis to reduce streamflow releases at the J.C. Boyle bypassed reach to balance temperature issues with habitat issues as was done in the draft EIS. The Hoopa Valley Tribe (p. 22) states that our analysis of the flow regime in the J.C. Boyle bypassed reach focuses only on the hottest part of the year (July 15) and does not take into account that their recommended minimum flow (500 cfs) would not raise the temperatures above the threshold level suitable for salmonids for most of the rest of the year, and would increase available habitat. The tribe comments that by ignoring any studies other than those developed by PacifiCorp, we have selected a flow regime that is not sufficiently protective of fish. NMFS (p. 26) comments that the Bureau's flow would not degrade the beneficial cooling effect of the springs on the thermal refugia in the bypassed reach. Interior (p. 71) requests that we provide the size (width and length) and number of fish that would be able to use the thermal refugia referenced on page 3-235, lines 34-35, of the draft EIS, under different bypassed reach flow alternatives. The Hoopa Valley Tribe (pp. 22-23) states that at the Bureau of Land Management's specified minimum flow of 470 cfs, the size of the thermal refugia in the J.C. Boyle bypassed reach would be reduced, but it would still be the largest on the Klamath River, capable of holding many thousands of adult salmonids.

Response: In the Staff Alternative, we recommend that minimum flows released into the J.C. Boyle bypassed reach be increased from 100 to 200 cfs, not decreased as implied by Oregon Fish & Wildlife. Although we acknowledge that increased minimum flows would benefit trout by reducing water temperatures in the short reach upstream of the springs, our analysis indicates that water temperatures in this short (about 0.5 mile) reach would still be only marginally suitable for rainbow trout, even given the relatively high temperature tolerance exhibited by Klamath River salmonids. Regarding the optimum temperature of 19°C cited from Behnke (1992) by Gard (2006), we note that Behnke referred to the study from which this optimum was derived as "an exception" from one study of trout from an Oregon desert basin, although we do note that Behnke (1992) reports having observed desert redband trout feeding at temperatures as high as 28°C. We revised the text in this section of the EIS to acknowledge the potential that higher flow releases may provide an additional benefit to rainbow trout in this reach if the optimal temperature for growth of Klamath River rainbow trout is higher than the general 13 to 16°C range for salmonids given by Behnke (1992). However, we also added text analyzing the potential that increasing minimum flow releases beyond 200 cfs could compromise the suitability of the reach downstream of the springs as holding habitat for adult spring Chinook salmon and steelhead, should these species be restored to this reach. The results of temperature modeling shown in figure 3-54 indicate that if the project dams were removed, daily average water temperatures downstream of the springs would exceed the range at which adverse effects on gamete viability (13 to 16°C) and increased risk of disease (14 to 17°C) would occur from July through August, when spring Chinook and steelhead would be holding in the river. Because mean monthly flows in July and August are generally lower than the minimum flows recommended by the Hoopa Valley tribe, we expect that water temperatures in the bypassed reach would be equal to or higher than the temperatures that were simulated for dam removal and shown in figure 3-54. In addition, we conclude that at the higher flow releases recommended by the agencies and tribes there would be substantial turbulence due to the high gradient and large substrate in the reach. This would result in rapid mixing of the warmer release water with spring inflows. As a result, we do not agree with NMFS's conclusion that the release of higher minimum flows would not degrade the thermal refugia, or reduce its value as holding habitat for spring Chinook salmon and steelhead.

A-23 Comment: Interior (p.13) and NMFS (p. 26) comment that the draft EIS needs to include more caveats regarding the habitat vs. flow values found using 1D PHABSIM modeling, and provide detailed justification for using the 1D modeling results in our analysis. They comment that it should include analysis of 2D PHABSIM modeling, Tennant/Tessman approach, side channel analysis, fish health and productivity information, and any other methods of flow analysis proposed by resource agencies.

Response: As discussed in the preceding response, our analysis focused on effects on water temperature, which we conclude likely limits the carrying capacity of the reach for rainbow trout. We also conclude that increasing minimum flows beyond the level that we recommend in the Staff Alternative would be likely to adversely affect the value of this major thermal refugia to support holding spring Chinook salmon and steelhead. The minimum flow that we adopt in the Staff Alternative would benefit rainbow trout by providing a substantial increase in physical habitat without risking adverse effects on this important thermal refugia, which would serve a key role in any attempt to restore spring Chinook salmon and steelhead to habitat upstream of Iron Gate dam. Incorporation of the alternative flow analysis techniques listed by Interior and NMFS would not alter these conclusions.

A-24 Comment: PacifiCorp (pp. 3-24 and 3-25), commenting on our analysis of instream flows in the J.C. Boyle bypassed reach on page 3-235 states that we use PHABSIM modeling as originally described in the license application. PacifiCorp points out that they updated this information in its April 2005 response to our AIR GN-2. PacifiCorp also provides WUA curves for Chinook and coho salmon and steelhead juveniles based on PHABSIM modeling for the bypassed reach. PacifiCorp concludes that the previous and new WUA curves support a release of 100 cfs from the dam.

Response: The figure of WUA versus discharge for redband/rainbow trout is from the report cited by PacifiCorp, and not from the final license application. We include the new figure of WUA versus discharge for juvenile anadromous salmons in this EIS, although PacifiCorp does not indicate whether the discharges shown in the figure represent minimum flow releases or total flows including the 200 to 250 cfs of spring accretion that occurs in the first 0.5 mile of the bypassed reach. In either case, it appears that a release of 200 cfs would provide more habitat than a release of 100 cfs.

A-25 Comment: PacifiCorp (pp. 2-3, 3-25 to 3-32, 3-38, and 5-6) recommends that the extra 100 cfs be released from J.C. Boyle powerhouse, rather than from the J.C. Boyle dam as we recommend. PacifiCorp states that a release of 200 cfs from the dam would start to impair water quality conditions in the bypassed reach by degrading the proportional influence of high-quality spring water that enters the upper part of the reach. PacifiCorp provides information to support this conclusion.

Response: Our analysis in the draft EIS leads us to conclude that a release of 200 cfs provides a good balance of increasing the physical habitat and food supply available to rearing trout while not adversely affecting the value of thermal refugia in the reach for rainbow trout or for future use by anadromous salmonids. We note that staff's proposed 200 cfs release from the dam is within the range of options that PacifiCorp proposed in its license application (release of a second 100 cfs either from the dam or from the powerhouse).

A-26 Comment: Interior (p. 71) clarifies that the Bureau of Land Management preliminary 4(e) condition does not require a 2 inch per hour ramp rate for the seasonal high flow events, and our text on page 3-239, line 6, of the draft EIS, should be corrected accordingly.

Response: We corrected the indicated text in this EIS.

A-27 Comment: Interior (p. 13) and NMFS (p. 31) comment there are known spawning areas in the J.C. Boyle bypassed reach where spawning habitat and incubating fish embryos could be dewatered due to

ramping effects. Because the Bureau of Land Management is prescribing a proportional flow regime, it is necessary to establish a protective ramp rate since spill operations would be manipulated on a regular basis. For the EIS analysis, Commission staff should incorporate the ALJ's findings of fact with respect to the risks and impacts of ramping in the bypassed reach.

Response: We include a down-ramping rate limitation of 150 cfs per hour (about 1.9 inches per hour) for the J.C. Boyle bypassed reach in the Staff Alternative. The Bureau of Land Management modified condition 4 includes a ramping rate limitation of 2 inches per hour for both upramping and downramping, with the exception of when implementing the seasonal high flow or when turbine capacity is exceeded. The Bureau of Land Management specifies that PacifiCorp would be required to develop and implement an appropriate ramp rate to follow after the seasonal high flow to prevent stranding fish in the J.C. Boyle bypassed reach, and the Commission would require PacifiCorp to consult with the fisheries management agencies on the development of this ramp rate. We note that the ALJ's conclusions on ramping pertain to the peaking reach, therefore, we have modified section 3.3.3.1.1, *Instream Flows*, of this EIS to address his conclusions.

A-28 Comment: Interior (p. 14) and NMFS (p. 31) state it is illogical that the draft EIS concludes that a 1.9 inch per hour ramp rate is deemed protective in the J. C. Boyle bypassed reach but a much less restrictive (4-9 inch per hour) ramp rate is needed in the peaking reach.

Response: We must consider both the costs and benefits of measures that we recommend for inclusion in a new license. A restrictive ramping ramp rate in a bypassed reach typically has only a minimal effect on project generation, because upramping and downramping occurs less frequently than it does in a reach downstream of a powerhouse that is used for peaking operations. Because of the minimal impact that a restrictive ramping rate imposed on a bypassed reach has on project operations, a more restrictive ramping rate is often justified even if the biological benefit is not substantial. Implementing a 2 inch per hour ramping rate in the peaking reach on a daily basis would eliminate much of the peaking capability of the project when evidence only indicates stranding occurs during the initial peaking cycle after extended periods of run-of-river operation. We now address this adverse affect by recommending a 2 inch per hour ramping rate during the initial peaking cycle, which gradually would transition to less restrictive rates. We also recommend stranding surveys to document the effectiveness of this approach.

A-29 Comment: Interior (p. 14) and NMFS (p. 31-32) comment that the EIS should clearly define what is in PacifiCorp's operational control. Both Keno and J.C. Boyle reservoirs have storage capacity that would allow some control over ramp rates even when flow exceeds turbine capacity. The draft EIS analysis of ramp rates is inappropriate and lacks scientific rigor because it ignores relevant information provided by the agencies and others, leading to inappropriate conclusions with respect to the impacts of existing and proposed ramp rates in the peaking reach. The EIS should include all relevant data and analysis provided to the record under this proceeding and give deference to data and studies specifically related to ramping and peaking effects rather than relying solely on unfounded assumptions about catch rates and fish densities.

Response: Keno development, which lacks turbines, normally operates as a run-of-river facility as described in section 4.7 *Keno Developmental Analysis*, and the vast majority of the changes in the discharge are the result of varying inflow to Keno reservoir and maintenance of the restrictive (+/-0.1 foot) range of the reservoir's water level. This reservoir level regime is based on an agreement with the irrigators to allow for the consistent operation of the large number of canals and pumps along Keno reservoir. Use of storage in Keno reservoir above current operations, especially during times of high flows, would directly affect the conveyance capacity of the Lost River Diversion Channel, the Klamath Straits Drain, and other structures and would require a detailed analysis and coordination with the Bureau of Reclamation, if Keno development should remain within the project boundary. When both turbines are

in operation at J.C. Boyle powerhouse due to high inflow to the reservoir, the reservoir is generally near the normal maximum elevation and often spilling water over the dam. J.C. Boyle reservoir has a relatively small reservoir area and the storage volume above the maximum water surface elevation of 3,793.5 feet is generally not used due to its small size and project operational constraints. As we discuss in the responses that follow, we have expanded our discussion of the biological effects of ramping rates in the peaking reach in section 3.3.3.2.1, *Instream Flows*, including discussion of the ALJ's conclusions regarding ramping rates, and we have modified our ramping rate recommendation for the peaking reach. Site specific evidence on the record for this proceeding that was available when we prepared our draft EIS indicated that stranding in the peaking reach was minimal. New information available after the draft EIS was issued indicates down ramp rates following the initial peaking cycle can result in substantial stranding events. Our discussions and recommendations in this EIS address this issue.

A-30 Comment: NMFS (p. 27-30) cites conclusions from the ALJ decision that show there is evidence that stranding in the peaking reach does occur, and that peaking operations harm existing resident trout population age structure, growth, and survival in the peaking reach. Conservation Groups (p. 21) similarly refer to the ALJ decision in supporting the agency recommendations for a 2 inch per hour ramping rate in the peaking reach.

Response: We have expanded the analysis in section 3.3.3.2.1, *Instream Flows*, including a listing of key ALJ conclusions regarding minimum flows and ramping rates. In this section, we state that we do not disagree with the ALJ's conclusion that the population of rainbow trout in the peaking reach would benefit from the more restrictive ramping rates proposed by the agencies and tribes, and we agree that the reach would be likely to produce larger fish. However, implementing the more restrictive ramping rates would have a substantial effect on the project's ability to meet peak load demands. We note the J.C. Boyle peaking reach currently supports a fishery that provides high catch rates and good wading conditions for several hours on most days, and that these lower flow conditions provide a good angling opportunity for less skilled anglers. We also conclude that the operational measures proposed by PacifiCorp and by Staff should serve to sustain and enhance this fishery. Measures proposed by PacifiCorp include a reduced downramping rate when flows are less than 1,000 cfs, and the proposed elimination of 2-unit peaking. In the Staff Alternative, we add a requirement that ramping be increased incrementally whenever peaking operation resumes after a period when flows have been stable, which should reduce the amount of stranding that occurs when peaking operations commence. We also include a provision for the incidence of fish stranding to be monitored, and for operations to be adjusted, if warranted, based on the results of monitoring. All of these measures should serve to benefit the trout population and improve the quality of the fishery in the J.C. Boyle peaking reach.

A-31 Comment: Oregon Fish & Wildlife states (p. 14) the draft EIS ignores the numerous studies and analyses that demonstrate redband trout in the J.C. Boyle peaking reach are not productive due to project operations and the lack of effective fish passage. The draft EIS erroneously concludes that the fisheries values in the Klamath River are exclusively tied to the ability of an angler to wade the river at low flows. Contrary to fisheries depending solely on an angler's ability to wade the river, fisheries depend on the productivity of fish populations, which is directly related to the quantity and quality of habitat. Interior (p 32) and Oregon Fish & Wildlife (p. 196) comment the draft EIS concludes the trout fisheries in Keno and J.C. Boyle peaking and bypassed reaches are in good condition and that none of the proposed changes in operation would adversely affect these fisheries (page 5-45, line 14). The ALJ found that project operations have and continue to adversely affect the resident trout fishery, and he rejected the argument that "under current operations there is an existing trout population that supports a high quality recreational fishery in the J.C. Boyle bypass and peaking reaches that is maintained by natural reproduction in Shovel Creek, the J.C. Boyle bypass reach, and Spencer Creek."

Response: As we noted in the preceding response, we have expanded our discussion of the biological effects of ramping rates in the peaking reach in section 3.3.3.2.1, *Instream Flows*, including discussion of the ALJ's conclusions regarding ramping rates, and we have modified our ramping rate recommendation for the peaking reach. The ALJ's stated rationale for his conclusion that operations continue to adversely affect the resident trout fisheries was that other factors should be examined before subjectively declaring a fishery is high quality, and that fishermen would also consider such factors as how often fishing is permitted and what size fish are being caught. We discuss these factors in section 3.3.3.2.1 of this EIS.

A-32 Comment: On page 3-242, lines 9-13, of the draft EIS, we indicated that based on PacifiCorp's modeling of bioenergetics and the influence of food and water temperature on growth rates of trout under different flow conditions, food availability is more important than water temperature and physical habitat as a factor that limits trout growth in the peaking reach. We noted that this suggests that current flow fluctuations may account for the smaller size of trout in the peaking reach compared to the Keno reach because of decreased benthic macroinvertebrate production. PacifiCorp (p. 3-36) clarifies that the average and median size of trout in the two reaches are similar on only trout older than 3 years are larger in the Keno reach and that any comparison between the two reaches should consider both their similarities and differences. If trout in the peaking reach are larger than the Keno reach up to age 3, it is counter to the suggestion that flow fluctuations may account form the smaller size of trout in the peaking reach since your trout feed almost exclusively on macroinvertebrates. The Hoopa Valley Tribe (p. 8) states that the EIS should carefully analyze and determine why older trout fail to survive in the project reaches where peaking occurs. PacifiCorp suggests that an alternative explanation for the larger size of trout over age 3 in the Keno reach is that these older trout are spending time in Keno or J.C. Boyle reservoirs, which may be energetically more favorable for growth. The Hoopa Valley Tribe (pp. 7, 25, and 26) and Klamath Tribes (pp. 9 and 10) state that the discussion of ramping rates and peaking in the draft EIS ignores the fact that stranding is only one impact of rapid flow fluctuations. The draft EIS analysis ignores the Commission's Salt Caves final EIS (a previously proposed hydroelectric project that would have been located along the peaking reach), which concluded that flow fluctuations below J.C. Boyle powerhouse, besides causing stranding of eggs, fry, and juveniles, caused chronic stress on trout from changes in water quality and the continued need for trout to seek new feeding and resting habitat while water temperature changed metabolism and feeding rates. The tribes note that flow fluctuations increase energetic demands on salmonids, flush juvenile salmonids downstream, and reduce macroinvertebrate production, and these facts must be analyzed in the EIS.

Response: We recognize that access to rearing habitat in Keno and J.C. Boyle reservoirs could be responsible for some of the difference in the size of trout in the Keno and J.C. Boyle peaking reaches. In section 3.3.3.2.1, *Instream Flows*, however, we discuss several factors associated with peaking that may affect the growth and survival rates of larger trout, including reduced aquatic insect production along stream margins and mortality of small fish and crayfish that are important food resources for larger trout. We also discuss the higher energetic costs of adapting to frequent, large changes in streamflows. We maintain, however, that the peaking reach provides a good fishery with high catch rates, and that the fishery would be sustained and improved with the measures that we include in the Staff Alternative.

A-33 Comment: Interior states (p.5) that the redband trout population estimates for the Klamath River from the Salt Caves study are not reliable and therefore should not be used as a basis for rejecting flow recommendations. NMFS comments (p. 30) that the draft EIS inappropriately compares abundance data between the Klamath River and other large Oregon rivers, as the Klamath River data was never verified, and data from other rivers had different ecological characteristics and harvest components. Until adequate fish population surveys are conducted, analysis should rely on population data that have been validated. Other than size, growth, and age structures which clearly demonstrate peaking and flow related impacts, no reliable or recent trout population density data exists for the Klamath River. Comparisons to other rivers should be restricted to river systems with comparable biological and hydrological attributes.

Response: We include in the Staff Alternative provisions for conducting population assessments at 3 year intervals for at least the first 9 years (after which the frequency of monitoring would be revisited), and for implementing further operational restrictions, if warranted, based on monitoring results. We also added a new figure to this EIS showing catch rates for 33 wild trout streams in California, which shows that catch rates reported in 2004 in the peaking reach was higher than all other streams that were surveyed. We note that developing statistically valid quantitative fish population estimates in the peaking reach that could be compared with other rivers would be exceedingly difficult because of problems associated with collecting fish in the predominantly steep gradient habitat and remote access associated with this reach.

A-34 Comment: Interior (p. 72), NMFS (p. 51), Cal Fish & Game (pp. 14 and 15), the Klamath Tribes (p. 9), and the Hoopa Valley Tribe (pp. 6 and 24) comment that the draft EIS (page 3-247, lines 1-6) cites PacifiCorp's stranding surveys to suggest that stranding potential in the peaking reach is low at the current ramping rate. However, PacifiCorp's stranding survey was inadequate to make this conclusion because it is difficult to detect stranded or trapped fry and they can be preyed upon prior to detection (Anglin et al., 2006). Recent observations of substantial fish and invertebrate stranding due to ramping in the peaking reach (Dunsmoor, 2006) should be included in our analysis. Further, findings from the EPAct hearings should be incorporated into our EIS. The ALJ decision states that "PacifiCorp's peaking operations cause high mortality to fish and other aquatic organisms through stranding." PacifiCorp (pp. 3-33, 3-34, and 3-36) acknowledges the new stranding information collected by Dunsmoor (2006) and concludes that it suggests the need for a modification to its proposed downramping rate, such as 2-inches per hour during the first down ramp event following a prolonged period (e.g., 10 days) of stable flow.

Response: We expanded our analysis in section 3.3.3.2.1, *Instream Flows*, to include information from Dunsmoor (2006) and the ALJ's conclusions. We modified the ramp rate included in the Staff Alternative that would require ramp rates to be increased gradually over several days at the start of each peaking period. We also include stranding monitoring and provisions for ramp rates to be modified, if warranted, based on monitoring results.

A-35 Comment: PacifiCorp, commenting on page 3-247, line 22, of the draft EIS states that our analysis must recognize that Bureau of Land Management's flow recommendations for whitewater boating would create a varial zone and change water velocities similar to what occurs under current operations. The creation of a weekly varial zone would be expected by PacifiCorp to have similar effects on macroinvertebrates as daily fluctuations.

Response: We modified the text in 3.3.3.2.1, *Instream Flows*, to note this potential adverse effect.

A-36 Comment: PacifiCorp (p. 3-34), commenting on page 3-240, lines 10-11, states that this line should be clarified to indicate that their proposed peaking operational regime at the J.C. Boyle powerhouse would occasionally entail operation from one-unit continuous operation to two-unit peaking, depending on flow conditions.

Response: We added clarifying text at the indicated location in this EIS.

A-37 Comment: Oregon Fish & Wildlife states (pp. 75 and 76) that Huntington (2004) analyzed ramp data that clearly demonstrated non-compliance with the existing ramp rate of 9 inches per hour in the J.C. Boyle bypassed and peaking reaches. In addition, Oregon Fish & Wildlife has frequently documented fish kills, often as a result of the ramp rates in different segments of the Klamath River from the Link River through the J.C. Boyle peaking reach. Oregon Fish & Wildlife staff recently documented a violation of the ramp rate in the Keno reach and subsequently a large macroinvertebrate and fish kill in the Keno reach (Tinniswood, 2006, Appendix 2). Oregon Fish & Wildlife uses this information and

Dunsmoor (2006) to support the need for a project operations plan that ensures feedback based on monitoring results and adjustments to the flow regime, if warranted.

Response: Our recommended project operation management plan would include provisions for reporting project-related flow information to appropriate entities. We would also require PacifiCorp to consult with resource and appropriate land management agencies regarding the results of any fish stranding monitoring that would be specified in a new license and any recommended project modifications that may be necessary based on the results prior to submitting the monitoring report to the Commission for approval.

A-38 Comment: PacifiCorp (pp. 3-34, 3-35, 5-6, and 5-7) note that in the draft EIS we recognized that there was considerable disagreement regarding the studies conducted by PacifiCorp in the peaking reach, so we focused our analysis on food production and fish stranding to assess peaking effects on fish. PacifiCorp believes that we would be justified in using the results of PacifiCorp's instream flow studies to evaluate the effects of alternative flow regimes. PacifiCorp emphasizes that their study designs were developed during agency consultation and included multiple habitat mapping efforts, multiple flow level measurements, a high number of transects, the addition of a 2-D modeling site, extensive site-specific data collection for species habitat suitability criteria development, and specific adjustments to standard habitat index computation to incorporate use of cover. Similar studies were conducted below Iron Gate dam (Hardy et al., 2006) and used to develop instream flow recommendations. PacifiCorp does not consider it appropriate to use the Tennant Method to recommend flow regimes, as the agencies have done, because it does not incorporate site-specific data into the decision process.

Response: We maintain that basing our analysis primarily on water temperatures in the J.C. Boyle bypassed reach and on factors that affect food production in the J.C. Boyle peaking reach is appropriate. Water temperatures are particularly important in the bypassed reach due to the unique value of this reach as potential holding habitat for spring Chinook salmon and steelhead, if they are reintroduced to this reach. It is appropriate to focus our analysis on food supply in the peaking reach based on the conclusion from PacifiCorp's bioenergetics study that food supply limits growth for larger rainbow trout, which is consistent with information from other studies that indicate that trout are able to maintain their weight and grow at high temperatures when food supplies are abundant.

A-39 Comment: Interior (p. 95) notes that in the draft EIS, we conclude that that water in the Copco No. 2 bypassed reach would be too warm to support resident trout, and use this conclusion to support our recommended minimum flow for this reach. Interior asks us to consider the technical memorandum from Gard (2006) in our EIS, which demonstrates temperature tolerance and added growth potential, given higher water temperatures and nutrient levels. Cal Fish & Game (pp. 15 and 16) states that there is no information that indicates higher water temperature is limiting trout productivity in this reach. The Hoopa Valley Tribe (pp. 27 and 28) states that our recommended 75 cfs minimum flow to the Copco No. 2 bypassed reach is not based on any apparent scientific rationale other than to say that "other physical constraints" would continue to limit trout productivity in this reach, in contrast to the recommendations of other agency experts. Our flow recommendation seems to be based on the cost to PacifiCorp of releasing higher flows and reflects a decision to prefer status quo power production in the face of continued environmental degradation, which violates NEPA and the FPA.

Response: We maintain that water temperatures in the Copco No. 2 bypassed reach would be marginal for supporting salmonids even at higher release flows. All water released into the bypassed reach would originate from Copco No. 1 reservoir, which supports a primarily warmwater fishery. Trout that reside in river segments that support quality trout fisheries below Keno and J.C. Boyle dams have access to coolwater refugia in the form of spring inflows and cool tributaries. Furthermore, we note that the Copco No. 2 bypassed reach is relatively short in comparison to the J.C. Boyle bypassed reach, so the length of stream that would be enhanced is relatively small and the potential for supporting a substantive fishery is

low. However, the costs of releasing high flow levels into this reach are substantial. When considering operational measures and other environmental measures, we must consider effects on both environmental and developmental resources.

A-40 Comment: Cal Fish & Game (p. 16) states that the draft EIS fails to consider the project impacts of channel armoring and vegetation encroachment on the fishery of the Copco No. 2 bypassed reach.

Response: On pages 3-13, lines 33-40, and 3-14, lines 1-2, we indicate that the Copco No. 1 bypassed reach is armored and subject to vegetation encroachment. We also discuss the effect of relatively low flow on the aquatic habitat in this bypassed reach on page 3-27, lines 2-7, and 3-52, lines 8-14, of the draft EIS. On page 3-173, lines 38-39, we point out that the Copco No. 2 bypassed reach consists of bedrock, boulders, large rocks, and occasional pool habitat. These conditions represent our analytic baseline. We indicate on page 3-52, lines 8-14, that given the current vegetation encroachment, mechanical removal of vegetation may be the only way to re-establish the open canopy and bare-surface conditions necessary for seed-recruitment of riparian vegetation, more typical of riverine habitat with a natural hydrograph. On pages 3-248 to 3-252 of the draft EIS, we discuss the effects of the proposed flows on fish habitat, including gravel and substrate composition in the Copco No. 2 bypassed reach.

A-41 Comment: The Hoopa Valley Tribe (p. 28) comments that our flow recommendation for the Copco No. 2 bypassed reach fails to consider the habitat needs of anadromous fish once they are reintroduced, focusing solely on resident trout. A minimum flow of 730 cfs is necessary not only to provide usable habitat for anadromous fish, but also to provide safe, timely, and effective passage through the Copco No. 2 bypassed reach. Under current conditions, NMFS (p. 33) and Cal Fish & Game (p. 16) agree that peaking and high ramp rates at the Copco facilities have relatively little impact on aquatic resources. This is a direct result of unmitigated project impacts almost eliminating the Copco No. 2 bypassed reach fishery. A logic that this "minimal fishery" does not deserve protective measures is unacceptable. The impact of peaking and high ramp rates below the Copco developments will be most apparent once habitat, passage, and anadromous species are restored to these areas. NMFS (p. 33) states that the peaking Copco powerhouses can release flows that fluctuate by almost 3,000 cfs on a daily basis. This hydrologic confusion below the Copco No. 2 powerhouse would interfere with vital migratory cues for outmigrating smolts, causing delays and exacerbating predation. NMFS and Interior (p. 14) disagree with the draft EIS conclusion that run-of-river operations at Copco will have no benefit for aquatic resources, and they recommend their 10(j) flows and ramp rates in the Copco No. 2 bypassed reach be included in the preferred alternative of the EIS. Interior (p. 13), NMFS (p. 31), and Cal Fish & Game (pp. 10, 11, and 13) state that the EIS needs to include analysis of impacts to salmonids other than trout (i.e., coho and Chinook salmon) in all project reaches, since the Staff Alternative includes the possibility of anadromous fish reintroduction.

Response: The integrated fish passage and disease management program that we include in the Staff Alternative includes provisions for monitoring and adaptive management in all reaches, which would enable operations and other measures to be modified if warranted. We note that the feasibility of restoring anadromous fish passage to the Copco No. 2 bypassed reach depends on whether passage of smolts through Iron Gate reservoir is feasible, and this is one of the critical uncertainties that would be addressed in the first 3 years of fish passage evaluations. As we discussed previously, we considered the effect of flow releases on water temperatures in the large thermal refugia for anadromous fish in the J.C. Boyle bypassed reach, which would likely be a critical holding habitat for spring Chinook salmon and steelhead if they are reintroduced to the reach.

A-42 Comment: Cal Fish & Game (pp. 17 and 18) states that PacifiCorp's fish sampling efforts in Fall Creek were based on a limited sample size that precludes confidence that the results are representative of actual conditions. Cal Fish & Game considers it inappropriate to dismiss the possibility that unscreened

power diversions, impassable diversions dams, or removal of all but 0.5 cfs of the natural flow have resulted in less than robust resources in Fall Creek, based on PacifiCorp's limited sampling program. Cal Fish & Game states that our draft EIS does not consider the ecological value of aquatic or riparian resources other than rainbow trout. The Staff Alternative in the EIS should incorporate the agency-recommended 40 percent of instantaneous inflow, which Cal Fish & Game estimates would range from 14 to 22 cfs, as a reasonable balance of project costs and resource benefits. Interior (p. 14) states the Fall Creek flow analysis in the draft EIS did not include the information or analysis provided by the resource agencies and other stakeholders, including Interior. The EIS needs to consider the recent ALJ findings for Fall Creek. The EIS should analyze the higher flow alternatives recommended by the resource agencies, such as providing 40 percent of the instantaneous flow to the bypassed reach.

Response: We maintain that the flow proposed by PacifiCorp would provide a substantial level of enhancement over existing conditions, and that a higher instream flow is not warranted. As noted above, the integrated fish passage and disease management program that we include in the Staff Alternative includes provisions for monitoring and adaptive management in all reaches, which would enable operations and other measures to be modified if warranted. However, we note that the length of the bypassed reach that would be accessible to anadromous fish is limited to about 0.2 miles by an impassable waterfall. We see no information in the ALJ's conclusions regarding what minimum flow would be appropriate in the Fall Creek bypassed reach.

A-43 Comment: Interior (pp. 15 and 67), Cal Fish & Game, (pp. 18 and 19), and Oregon Fish & Wildlife (pp. 142-145) note that, although the draft EIS concurred with the resource agency recommendation for no flow diverted from June 1 through September 15, it did not accept the recommendation that 50 percent of inflow be maintained between September 16 and May 31 and instead recommended 1 cfs for that time period. Cal Fish & Game points out that the Spring Creek fishery assessment conducted by PacifiCorp entailed a limited sampling effort and therefore is of little value for analyzing flow alternatives. All three agencies state that 1 cfs is an arbitrary designation without any corresponding analysis to justify it as an alternative, it would not provide adequate habitat for fish looking for cover and interstitial places to hide and conserve energy during the winter months, and it would not provide refugia from high flows on Jenny Creek. They also state that, below the PacifiCorp diversion, the channel is wide enough to accommodate 16.5 cfs so maintaining flows at 1 cfs would only provide shallow, marginal aquatic habitat, which would have the potential for winter freezing, further decreasing habitat quality. The agencies note that the flow regime would also cause low flows in the winter and high flows in the summer, which are exactly opposite of what has occurred in this basin historically and the aquatic organisms in this system are adapted to. Finally, they state that with adequate flow, Spring Creek would be a cold water source for Jenny Creek in the summer months and a warm water source in the winter months, providing a corresponding cold and warm water refugium. Recognizing that releasing 50 percent of the inflow would require additional facilities to determine the instantaneous release requirement as well as accommodating changing release flows, FWS, Oregon Fish & Wildlife, and Cal Fish & Game recommend that PacifiCorp release 4 cfs from September 16 through May 31. By increasing the winter flows to 4 cfs, they state that there is great potential for fish to use this stream as a winter refugium and for aquatic mollusks to maintain their presence below the PacifiCorp diversion.

Response: Based on the new information presented at the 10 (j) meeting and in a subsequent filing by Oregon Fish & Wildlife on the unique genetic status of rainbow trout in Spring Creek, we updated our analysis in section 3.3.3.2.1, *Instream* Flows, and include the 4 cfs minimal flow from September 16 to May 31 in the Staff Alternative.

A-44 Comment: Interior (p. 15) states that the EIS should describe impacts of documented strandings of anadromous salmonids and other fish as a result of Iron Gate dam operations and identify appropriate operational requirements that are within PacifiCorp's ability to implement.

Response: We describe the one documented case of fish entrapment or stranding that we are aware of in footnote 58 on page 3-261 of the draft EIS. Because Interior does not provide any additional information or citations to support its statement regarding other stranding events, we are not able to include any information on these events in this EIS.

A-45 Comment: PacifiCorp (p. 3-36), commenting on page 3-261, lines 12-16, of the draft EIS, states that, although we are correct in stating that only one fish stranding event has been documented below Iron Gate dam, we should clarify that the event was not caused by or related to operations at Iron Gate dam. Flows and flow changes were "essentially a natural event beyond the control of PacifiCorp." PacifiCorp also states that it would be more accurate to characterize this single event as "a fish entrapment in an artificial channel."

Response: We modified the text in section 3.3.3.2 accordingly.

A-46 Comment: NMFS (p. 34) and the Forest Service (pp. 2 and 3 of 4) state that the EIS analysis of flows downstream of Iron Gate dam should include contingencies for the possibility that the Endangered Species Act or current ESA listings are changed during the next license term, and NMFS recommends that the flows that are finally deemed appropriate by Interior and Department of Commerce (which NMFS considers to be a 2006 report by Hardy, Addley, and Saraeva), be required in a new license. The Forest Service states that if coho salmon are delisted, the best available information should be used to guide instream flows which can protect aquatic habitat and water quality and such flow, unless drastically reduced from Hardy et al. (2006), should protect non-fisheries National Forest values. Cal Fish & Game (p. 20) states that once finalized, the Hardy et al. (2006) report would represent the best available information and it would consider adjusting its minimum flow recommendations below Iron Gate dam based on that information.

Response: We now recognize the agency's concern that, if coho salmon should be delisted, the provisions of the associated BiOp at Iron Gate dam would no longer dictate the flows releases to the Klamath River downstream of Iron Gate dam. Our revised recommendation in this EIS includes contingencies that would govern Iron Gate dam operations, consistent with the best available information. Although Hardy et al. (2006) may currently represent the best available information upon which to base flow recommendations downstream of Iron Gate dam, there is no guarantee that this would be the case in the future, when and if coho salmon should be delisted. We consider it important to incorporate a flexible approach not tied to specific studies such as Hardy et al. (2006) but to all relevant studies, including those that may not yet have been conducted, should the need arise for adjusting the flow regime downstream of Iron Gate dam.

A-47 Comment: Cal Fish & Game (p. 21) notes that setting appropriate minimum flows downstream of Iron Gate dam is complicated by continuing uncertainty over the amount of control PacifiCorp can exert over such flows.

Response: Details on the extent to which PacifiCorp can control outflows from Iron Gate dam are discussed on page 5-34 and elsewhere in the draft EIS. We conclude that, except for short-term emergencies needed to avert fish losses or to enhance water quality, the limited storage capacity under PacifiCorp's control is not sufficient for long-term flow supply. We recommend that maintenance of the instream flow schedule based on Reclamation's Klamath Irrigation Project Operations Plans, similar to existing conditions, is appropriate.

A-48 Comment: Cal Fish & Game (pp. 21 and 22) comments that the draft EIS takes the agencies run-of-river flow recommendation at Iron Gate dam out of context ("…while continuing peaking operations at the upstream J.C. Boyle and Copco developments…"). Cal Fish & Game points out that the resource

agencies recommended run-of-river operations at all project facilities, not just Iron Gate development, and examining individual flow recommendations reach by reach, while assuming current flow operations apply in all other reaches is not an effective analytical approach. Cal Fish & Game agrees with our assessment on page 5-35 of the draft EIS that substantial flow fluctuations could adversely influence habitat downstream of Iron Gate dam, and requests that we use the same unifying principles regarding flow management upstream of Iron Gate dam, at habitat influenced by peaking operations. Cal Fish & Game states that: "In the draft EIS, the only consistent principles applied are the need to minimize cost to PacifiCorp and maximize power generation." The EIS also needs to apply a balancing ecological principle.

Response: Our complete statement on page 5-35, lines 5-9, of the draft EIS, is as follows: "Implementing run-of-river operations at Iron Gate dam while continuing peaking operations at the upstream developments would result in substantial flow fluctuations downstream of Iron Gate dam…" This statement was meant to acknowledge that with implementation of the Bureau of Land Management's then preliminary and now its current modified 4(e) condition, peaking flows would occur once per week from May through October, and thus if Iron Gate is operated in a run-of-river mode, there would be the flow fluctuations that we describe. We modified the indicated sentence in this EIS to clarify this point. Our draft EIS also points out on page 5-35, lines 10-16, that even if upstream project developments are operated in a run-of-river mode, Klamath Irrigation Project operations result in daily fluctuations of as much as 775 cfs, and such flow fluctuations would need to also be released from Iron Gate dam if the project as a whole is operated in a run-of-river mode. The FPA requires us to evaluate whether the environmental benefits expected from any proposed, recommended, or specified measure is worth the associated cost.

Fish Passage

A-49 Comment: Interior (pp. 72 and 73) and NMFS (p. 52), commenting on pages 3-263, line 4, and 3-269, line 32, of the draft EIS, point out that we fail to mention the fish ladder at Link River dam completed by Reclamation in 2005 that is capable of passing anadromous fish is currently operating. Because of this fish ladder at Link River dam, successful passage at Keno dam means fish gain access to more than 350 miles of habitat in the upper basin, not 20.1 miles of reservoir habitat and 1.2 miles of riverine habitat, as stated on page 3-269 of the draft EIS. The EIS needs to be revised accordingly.

Response: We describe the new fish ladder at Link River dam on page 2-1, lines 35-40, of the draft EIS, and point out that this ladder should enable salmonids (which would include anadromous salmonids) to pass from Link River to Upper Klamath Lake. The new fish ladder is again mentioned in the affected environment section of Aquatic Resources on page 3-165, lines 5-7, of the draft EIS. We added text to section 3.3.3.2.3, *Fish Passage*, of this EIS to remind the reader that upstream fish passage facilities are already in place at Link River dam.

A-50 Comment: Oregon Fish & Wildlife (p. 168) states the EIS should adequately describe and analyze project impacts on resident and anadromous fish resources from lack of upstream and downstream passage at all facilities.

Response: We modified section 3.3.3.2.2, *Fish Passage*, of this EIS, to describe adverse effects of the project on habitat connectivity for resident and anadromous fisheries, and we expanded our discussion of the potential benefits of improving fish passage. In section 3.3.3.2.5, *Anadromous Fish Restoration*, we describe additional information that would be collected under our proposed integrated fish passage and disease management program that would aid in selecting the most beneficial approach for restoring access to habitat within and upstream of the project. Although we acknowledge that volitional passage could potentially provide the greatest increase in habitat connectivity to habitat within the project reaches, we

describe information that we consider to be critical for assessing the most beneficial approach for restoring passage for anadromous fish species, which are of very substantial value to commercial, recreational, and tribal fisheries.

A-51 Comment: Oregon Fish & Wildlife comments (p. 31-32) that the draft EIS (pp. 5-82 to 5-86) notes that the Commission has accepted the Oregon Fish & Wildlife Commercial Fishing Codes, which includes Oregon Revised Statutes (laws) for screening and passage. The draft EIS concludes that the Staff Alternative is consistent with comprehensive plans, but clearly this is not so since our statutes and policies require fish passage and screening at dams that block fish migration. Oregon Fish & Wildlife concludes that the Staff Alternative is inconsistent with this comprehensive plan.

Response: We revised the Staff Alternative to include measures to provide upstream and downstream fish passage at the Spring Creek (Fall Creek development) and J.C. Boyle diversions, consistent with Oregon's comprehensive plan.

A-52 Comment: Interior (p. 72) and NMFS (p. 52), commenting on page 3-269, line 3, of the draft EIS, note that impingement of larval suckers may very well occur with salmonid criteria screens at East Side and West Side developments. However, FWS has consulted with Reclamation regarding the installation of salmonid criteria screens at the A-canal diversion, and authorized take of larval suckers subject to these screening criteria. Salmonid criteria screens meet the same specifications as those designed to protect federally listed suckers. Moursund et al. (2000) also concluded that most lamprey pass beneath bypass screens and into turbine intakes because they tend to remain low in the water column. In the laboratory Moursund et al. (2000) exposed lamprey to pressure and shear forces that simulated turbine passage, and juvenile lamprey were not injured during conditions known to kill other fish species. Thus, it is unlikely that the screening facility would have to be modified to accommodate these two species. The EIS needs to be revised include these facts.

Response: A major difference between the A-canal and Link River dam is that sucker larvae passing over Link River dam have access to suitable rearing habitat in J.C. Boyle reservoir, while sucker larvae entrained into the A-canal are unlikely to find suitable rearing habitat, and are lost to the population. Therefore, impingement losses at the A-canal do not represent an increase in losses to the population, while impingement losses at Link River dam would adversely affect sucker recruitment in J.C. Boyle reservoir and reduce the population of adult suckers that have a potential future role in species recovery.

Regarding lamprey, in section 3.3.3.2.5, *Anadromous Fish Restoration*, we reviewed information related to lamprey passage that was filed in the EPAct 2005 proceeding on disputed issues pertaining to preliminary mandatory conditions. Our review of Judge McKenna's September 27, 2006, decision and its supporting documentation reinforces our understanding that the development of effective screening criteria for Pacific lamprey is in early stages. We note that the relatively high survival rate of lamprey during turbine passage suggests that mortality rates for this species may increase due to impingement if screens are installed. We further note that the depth at which lamprey migrate is not relevant, because implementing volitional passage, as prescribed by Interior and NMFS, would screen the entire flow that enters each powerhouse, which would preclude lampreys from passing underneath fish screens.

A-53 Comment: On page 3-280, lines 28-33, of the draft EIS, the Commission states that: "We do not see any basis, however, for the requirement that each fish ladder be designed to pass 5 to 10 percent of the high design flow to create sufficient flows to attract and pass targeted species at each fishway. If PacifiCorp can provide a sound basis for using a lower amount of attraction flow and demonstrate via post-construction evaluation studies that the attraction flow is sufficient to attract fish to enter and ascend the facility, the lower attraction flow volumes should be allowed." NMFS (p. 57) comments that 5 to 10 percent of the high design flow is a NMFS guideline for attraction flows. A guideline is a recommended

design feature that will generally result in safe and efficient fishway facility design. Different sites will have different attraction flow needs to adequately attract fish. For instance, less water may be required in a narrow river, like the Klamath River, where fish cannot wander too far while searching for a migration corridor, than in a wider river. NMFS will consider these comments in the development of the modified prescriptions.

Response: NMFS/Interior's modified prescription does include a provision for appropriate attraction flows to be determined by design studies and post-construction evaluations. Even though the indicated criteria are from appropriate guidelines, if they are included in a mandatory prescription, the specified criteria would need to be followed regardless of site-specific circumstances that might dictate variation. We appreciate this recognition by NMFS/Interior in the modified prescription.

A-54 Comment: Interior (p. 65), commenting on page xxix, line 38, of the draft EIS, states that we should change "When finalized, the fishway prescriptions and 4(e) conditions may need to be included in a new license for this Project" to "When finalized, the fishway prescriptions and 4(e) conditions will be included in a new license for this Project." Cal Fish & Game (p. 31) states that the Staff Alternative needs to include the mandatory fishway prescriptions of both Interior and NMFS.

Response: We purposely use "should," "would," and "may" rather than "shall" and "will" in our NEPA licensing documents to describe our recommendations as well as terms and conditions of other entities, including agencies with mandatory conditioning authority, because our document only makes recommendations that advise the Commission regarding its ultimate licensing decision. We reserve the definitive terms "shall" and "will," for the order that would be issued by the Commission pertaining to this proceeding. We cannot prejudge in our NEPA document that a new license for this project would be issued. Our choice of words to describe fishways and 4(e) conditions in the NEPA document should not be interpreted as questioning of the mandatory conditioning authority of appropriate agencies.

A-55 Comment: Cal Fish & Game (p. 30) states that the EIS needs to fully analyze how many juvenile anadromous outmigrants would be spilled with the Staff Alternative.

Response: The integrated fish passage and disease management program included in the revised Staff Alternative includes provisions for conducting radio-telemetry studies using wild smolts to determine the effectiveness of spill passage over a range of spill flows. This would provide a basis for estimating the proportion of smolts that successfully outmigrate via spills. The actual number passed via spills during a given year would depend on the frequency and volume of spills and the total number of smolts that attempt to outmigrate; both of which would vary between years.

A-56 Comment: Interior (p. 73) and NMFS (p. 52-56) comment that, despite study requests from Interior and NMFS, PacifiCorp has not provided site-specific evidence, materials, study results, or data to substantiate PacifiCorp's position that project tailrace configurations will not have adverse impacts on anadromous fish. The Commission (1994) identifies tailrace barriers as a feasible, common solution to injury or delay of fish at tailraces. Interior (p. 76) and NMFS (p. 60) refer to studies that attribute injuries to migrating salmonids to tailrace structures beginning on page C-47 of the fishway prescriptions. The EIS should adequately analyze the benefits of tailrace barriers at the project, given the studies referenced by Interior and NMFS, and consider an alternative that includes adequate, independently conducted studies of the potential need for tailrace barriers at Copco Nos. 1 and 2, J.C. Boyle, East Side, and West Side powerhouses.

Response: The integrated fish passage and disease management program that we include in the revised Staff Alternative includes provisions for conducting radio telemetry studies on adult anadromous fish to determine whether tailrace barriers are needed. These evaluation studies are also included in

NMFS/Interior's modified fishway prescription and in PacifiCorp's December 1, 2006, alternative prescription.

A-57 Comment: PacifiCorp (pp. 2-1, 2-2, and 3-37), commenting on sections 2.3.1.2, *Section 18 Fishway Prescriptions*, and 3.3.3.2.2, *Fish Passage*, of the draft EIS, states that it reached agreement with FWS and NMFS on a stipulation that, if volitional fish passage is prescribed, PacifiCorp would study the need for and design of spillway modifications and tailrace barriers for anadromous and native resident fish and that NMFS and FWS would base the need to implement spill modifications and tailrace barriers on the results of the studies and other available information.

Response: We modified the text in sections 2.3.1.2 and 3.3.3.2.2 of the EIS to reflect this information**.**

A-58 Comment: PacifiCorp (p. 3-38) states that before tailrace studies are conducted, pursuant to the stipulation reached during the EPAct proceeding, clear performance criteria should be established to determine what constitutes acceptable migrational delay or injury.

Response: Establishing clear performance criteria would define success and help to ensure that passage measures are implemented in a timely and cost-effective manner. We modified our recommendation pertaining to an aquatic resources monitoring and management plan in section 5.1.1.2, *Staff Alternative*, to include provisions for identifying specific resource goals expected to be achieved by the project facilities, operations, and environmental measures.

A-59 Comment: PacifiCorp's (pp. 3-37 and 3-39) opinion is that a similar adaptive approach should be taken in the downstream fish passage facilities as was specified in the stipulation for spillway modifications and tailrace barriers. For example, if downstream migration of juvenile smolts through project reservoirs is low, a better approach may be to construct downstream passage facilities at the head of each reservoir, thereby eliminating reservoir mortality. PacifiCorp states that downstream fish passage facilities should be sited based on their ability to achieve clearly defined performance objectives.

Response: The revised Staff Alternative is consistent with this alternative. The Staff Alternative incorporates an integrated assessment of critical uncertainties relating to fish passage to identify the most beneficial and feasible measures to restore anadromous fish to habitat upstream of Iron Gate dam.

A-60 Comment: PacifiCorp (p. 2-2), commenting on section 2.3.1.2, *Section 18 Fishway Prescriptions*, of the draft EIS, states that, because the preliminary fishway prescription design criteria are based on biological evaluations, it should not be obligated to perform any biological evaluations on such fishways or track the number or species that use the facilities. PacifiCorp (p. 2-6) makes a similar comment regarding our recommendation 12S (fish passage resource monitoring plan) which includes provisions for evaluating and monitoring fish passage in the fishways, stating that biological evaluations should only be necessary if non-criteria designs are used. In addition, because water quality parameters such as temperature and DO are not specified design criteria, PacifiCorp should not be compelled to measure these parameters. PacifiCorp indicates that once the facilities are built, it would evaluate the designed performance criteria, make any necessary adjustments, and develop plans to ensure the facilities are maintained and continue to operate under the established criteria.

Response: Fishway performance at specific sites is not only a function of design criteria developed during research and monitoring at facilities elsewhere in the country, but site-specific physical and environmental factors that cannot easily be duplicated elsewhere. Fish populations in specific watersheds also may have unique traits that influence their ability to use fishways. If biological evaluations of fishway performance and monitoring of water quality conditions were not conducted, there would be no

assurance that the fishways would provide any resource benefits. We include these types of monitoring in the Staff Alternative to ensure that the intended resource benefits are attained.

A-61 Comment: Page 2-27, lines 44-48, and page 2-28, lines 1-7, of the draft EIS, which describes one of the general fishway prescriptions for the project, states that PacifiCorp would prepare a fishway evaluation and modification plan for each fishway that includes, among six specified elements: (1) a quantified program to meet FWS and NMFS fish passage goals, objectives, and strategies; and (2) FWS's and NMFS's criteria by which to measure progress towards fisheries management goals. PacifiCorp (p. 2-2) states that these two elements of the plan are agency responsibilities, not PacifiCorp's.

Response: The resource goals and objectives stated in the Interior/NMFS fishway prescription are relatively broad in nature. These include providing access to historical spawning, rearing, and migration habitats; restoring volitional passage for all life history phases of anadromous and resident fish throughout their historical range; and restoring native fish populations to meet tribal trust responsibilities, enhance ocean commercial harvest, recreational fishing, and the economic health of local communities. Our analysis in section 3.3.3.2.5, *Anadromous Fish Restoration*, identifies two critical uncertainties that we conclude must be addressed before the most appropriate and effective method for restoring fish passage through the project can be determined. Accordingly, we conclude that holding PacifiCorp responsible for meeting these objectives would not be appropriate if PacifiCorp is required to implement the Interior/NMFS fishway prescription in its current form, before these uncertainties are addressed. We conclude, however, that for any fishways that are installed, it is appropriate to monitor passage at each fishway and to modify the fishway if it does not perform satisfactorily, based on monitoring results, using predetermined criteria (established in the fish passage resource management plan that we include in the Staff Alternative) for successful passage. Achievement of successful fish passage at each development would ensure that PacifiCorp is doing its part to address the overall goals and objectives of the resource agencies that pertain to restoration of native fish populations in the Klamath River basin.

A-62 Comment: Interior (p. 73) and NMFS (p. 53), commenting on page 3-270, line 23, of the draft EIS, state that the ability of the fish ladder at Keno dam to pass salmon and steelhead, when it is properly maintained, is not in question at this time. Interior and NMFS did not prescribe a new ladder, but prescribed modifications to the existing ladder to accommodate lamprey. The EIS needs to be revised to include this information.

Response: Interior and NMFS also prescribed that the ladder be modified to include a screened auxiliary water system that provides forebay water of the correct water quality and quantity to effectively attract fish. We assume this measure is intended to improve attraction of all anadromous species, and not just lamprey. We recognize that the existing fish ladder is likely to be able to provide upstream passage for anadromous fish, but still conclude that once anadromous fish ascend the ladder, it is uncertain whether they would be able to successfully pass through Keno reservoir and Upper Klamath Lake to reach potential upstream spawning habitat given current conditions. We added text to clarify our conclusion.

A-63 Comment: Interior (p. 41) states that PacifiCorp should be required to evaluate the existing fish ladder at Keno dam and, if appropriate, modify the facility to accommodate upstream fish migration even if Keno development is not included as part of a new license.

Response: We expanded our discussion in section 3.3.3.2.2, *Fish Passage*, to include additional information filed by Oregon Fish & Wildlife subsequent to the 10(j) meeting that was held in December 2006. Based on that information, we conclude that Lost River and shortnose suckers are able to migrate upstream past Keno dam using the existing Keno ladder, and that the upstream migration of suckers to Keno dam may be limited by conditions in the Keno reach during periods of low to moderate flow. If the passage of anadromous fish to areas upstream of J.C. Boyle is implemented in the new license, we expect

that passage would be monitored at Keno ladder by PacifiCorp if Keno development is retained as part of the project. Subsequent modifications could be implemented if the ladder is found to impede the passage of suckers or anadromous fish species. If Keno development is not included in a new license, the Commission would have no authority to require PacifiCorp to monitor the Keno fish ladder but such monitoring could be conducted by others.

A-64 Comment: Interior (p. 73) and NMFS (p. 53), commenting on page 271-1, line 1, of the draft EIS, state that it is incorrect to state that passage at Keno dam would provide little benefit to trout in the Keno reach. The findings of the ALJ show that life history strategies (such as spawning above the J.C. Boyle dam) are denied to the resident trout population below the dam; the project restricts migration of resident fish within the mainstem and into and out of the tributaries. Interior and NMFS suggest revising the EIS to adequately analyze the needs of resident trout and benefits of passage to resident trout at Keno dam.

Response: The indicated text in the draft EIS pertains to the need for improving fish passage at Keno dam, not providing fish passage at Keno dam. We found no information in the record to indicate that the existing Keno ladder does not provide effective passage for rainbow trout, and we modified the text in section 3.3.3.2.2, *Fish Passage*, to include a description of monitoring conducted from 1989 to 1991 that documented successful passage of rainbow trout at the Keno ladder. As noted in the previous comment, we expect monitoring studies at the Keno ladder would be conducted if passage of anadromous fish is restored to the Keno reach and the Keno development remains part of the project. The need for modifications to facilitate passage for rainbow trout or anadromous fish species could be evaluated based on study results.

A-65 Comment: Interior (pp. 26-28) and Cal Fish & Game (pp. 33-36) comment that the EIS needs to give full and equal consideration to an alternative that adequately mitigates for the loss of upstream and downstream migration to resident fish at all project facilities, including Copco Nos. 1 and 2, and Iron Gate dams. The stock of redband trout in the bypassed and peaking reaches below J.C. Boyle dam is denied use of Spencer Creek and other suitable habitat upstream of the J.C. Boyle dam because of the ineffective fish ladder and downstream passage system.

Response: We expanded the text in section 3.3.3.2.2, *Resident Fish Passage*, to discuss factors that may be responsible for reduced usage of the J.C. Boyle ladder by rainbow trout since the first several years after J.C. Boyle dam was constructed. These include: the inundation of favorable spawning habitat near the mouth of Spencer Creek, entrainment of downstream migrating trout due to ineffective screens at the J.C. Boyle intake, and an increase in stream gradient in a reach just downstream of the ladder entrance. PacifiCorp recently modified the channel downstream of the J.C. Boyle ladder to improve passage, and we include the installation of a new screening facility at J.C. Boyle as part of the Staff Alternative. We see no evidence that the ladder requires modification beyond the minor improvements proposed by PacifiCorp.

Although we agree that it is likely that rainbow trout historically migrated throughout the Klamath River and its tributaries in the project area, we consider it unlikely that the migratory form can be restored to habitat between Copco No. 1 and Iron Gate dams in the near future, at least with the project dams in place. We base this conclusion on degraded water quality conditions in project reservoirs and continued inundation of the lower portion of all tributaries in this reach, which likely provided favorable spawning habitat and thermal refugia during the summer months. Due to the presence of substantial temperature refugia and spawning habitat in the J.C. Boyle bypassed reach and in several tributaries, we consider it much more likely that the migratory life form can be restored to the reaches upstream of Copco reservoir, after new fish screens have been installed at J.C. Boyle.

A-66 Comment: PacifiCorp (p. 3-37), commenting on our discussion of fish passage at J.C. Boyle dam on page 3-272, line 15, of the draft EIS, states that we should note that Fortune et al. (1966) indicates that there is no spawning gravel in the Keno reach.

Response: We modified the text in section 3.3.3.2.2, *Resident Fish Passage*, to note the lack of spawning gravel in this reach.

A-67 Comment: PacifiCorp (pp. 2-1 and 3-38) states that it no longer proposes a surface collection system (gulper) to provide downstream fish passage at the J. C. Boyle development, referring instead to its proposed modifications to the Interior and NMFS fishway prescriptions.

Response: We understand that PacifiCorp has filed alternatives to Interior/NMFS's preliminary and modified prescriptions. If PacifiCorp no longer proposes a surface fish collection system, it is unclear what it proposes to replace this measure with. The footnote on page 5 of PacifiCorp's December 1, 2006, letter to the Commission states that: "Those filings (referring to PacifiCorp's alternative fishway prescriptions) should not be considered to be replacements of PacifiCorp's existing proposed alternatives. PacifiCorp is not withdrawing its existing proposed alternatives." Lacking a clear statement of intent, we consider the measures described in the license application to constitute PacifiCorp's licensing proposal, but we include evaluation of PacifiCorp's proposed alternatives to the preliminary and modified fishway prescription in sections 3.3.3.2.5 and 5.2.6 of this EIS.

A-68 Comment: Interior (pp. 21 and 65) and NMFS (p. 50) comment that the draft EIS analysis assumes that current fishways are adequate for anadromous fish at J.C. Boyle dam. However the fish screening and bypass systems in place do not conform to current criteria for resident and anadromous fish. The seals at the J.C. Boyle dam have rendered the fish screens partially ineffective, allowing fish to be entrained in the turbines. The EIS should consider the need for a downstream fishway that meets current criteria at J.C. Boyle dam.

Response: In section 3.3.3.2.2 of the draft EIS, we state that the existing fish screen at the J.C. Boyle development does not meet current agency screening criteria, and based on the results of PacifiCorp's radio-telemetry studies and collection of trout behind the screens when the canal is dewatered, we concluded that it does not prevent fish from being entrained into the power canal. As part of the integrated fish passage and disease management program that we include in the Staff Alternative, PacifiCorp would be required to construct a screening facility that meets NMFS screening criteria at J.C. Boyle in the first year after license issuance.

A-69 Comment: Interior (p. 26) states the channel work on the gradient for the approach to the J.C. Boyle ladder, referenced on page 5-40 of the draft EIS, is to bring the existing license into compliance and has been completed. Interior states that this regrading work is being inappropriately characterized as work PacifiCorp would do for the relicensing and apparently included in the cost of a new license in the draft EIS. Without adequate testing of the success of fish passage since this regrading, there is little basis for concluding that the upstream fishway would be adequate over the term of a new license.

Response: We did not include the cost of the regrading work as part of PacifiCorp's proposal; we only described this work to point out that this potential passage impediment had been addressed. The integrated fish passage and disease management program that we include in the Staff Alternative includes provisions for conducting radio-telemetry studies to determine whether the ladder performs satisfactorily after the modifications proposed by PacifiCorp have been implemented.

A-70 Comment: PacifiCorp (pp. 3-38 and 5-3), commenting on our statements on pages 3-272, lines 34-42, and section 5.2.2, *Restoration of Slopes and Channel at the J.C. Boyle Bypassed Reach*, of the

draft EIS that sidecast material in the J.C. Boyle bypassed reach could form a barrier or at least impede upstream passage of fish at existing flows, states that there is no evidence of any impediment of fish passage in this bypassed reach. PacifiCorp's 2003 telemetry study document that rainbow trout were able to move up the J.C. Boyle bypassed reach with no impediments under existing conditions. PacifiCorp notes that Oregon Fish & Wildlife continued assessing rainbow trout movement in the peaking and bypassed reach and its 2006 report did not identify the sidecast material encroachment on the channel as a passage impediment. Consequently, PacifiCorp concludes that our recommendation to remove sidecast material from the bypassed reach is unwarranted.

Response: Our review of PacifiCorp's telemetry study (section 5 of the Fish Resources Final Technical Report; PacifiCorp, 2004e) indicated that only two of the tagged trout moved upstream past the boulder restriction, and the study does not indicate when these fish moved by the restriction and what the flow in the bypassed reach was at the time that these fish moved upstream. However, we conclude that although the sidecast material may serve as a barrier to fish migration under the current minimum flow regime (100 cfs plus about 220 cfs from spring accretion) it would likely not represent a substantive barrier under our recommended flow regime (200 cfs plus 220 cfs from spring accretion) or higher flows that may be included in a new license as mandatory conditions. We therefore modified the Staff Alternative to not initially include removal of sidecast material although it could still be an adaptive measure that is implemented if monitoring indicates that the sidecast material is impeding fish passage.

A-71 Comment: PacifiCorp, commenting on page 3-275, lines 19-26, of the draft EIS, where we discuss the possibility of modifying the bedrock sill in the Copco No. 2 bypassed reach to facilitate upstream fish passage, states that it agrees if anadromous fish are restored to this reach, studies should be conducted to determine if the bedrock sill is a passage impediment.

Response: We include telemetry studies that would allow impediments to passage to be identified and addressed as part of the integrated fish passage and disease management program, which we include in the Staff Alternative.

A-72 Comment: Interior (pp. 28, 29 and 68) and Cal Fish & Game (pp. 34 and 35) comment the draft EIS concludes fish passage is not warranted at both Spring and Fall creeks, based on relatively high catch rates of trout. This rationale, which ignores both Oregon and California state regulations, contradicts the draft EIS approach to resident fish passage between the mainstem California facilities. In the Copco No. 2 bypassed reach, relatively low catch rates of trout and a lack of suckers (page 3-173 of the draft EIS), appear to justify eliminating resident fish passage from the draft EIS analysis. Interior states that to accurately assess the impact of the project on resident fish passage would require studies involving radio tagging and monitoring of adult trout movement in conjunction with an entrainment study. PacifiCorp chose not to perform fish passage studies on these tributaries, but rather chose to proceed with installation of fishways based on the information available. For the Spring and Fall creek fisheries, this is a reasonable and appropriate mitigation measure. With improved flow conditions on Spring Creek, the amount and condition of fish habitat would also improve, as would the number of fish using this stream. The EIS needs to give full and equal consideration to an alternative that adequately mitigates for the loss of upstream and downstream migration to resident fish in Fall and Spring creeks. Conservation Groups (p. 15) questions our conclusions in the draft EIS pertaining to fish passage provisions at the Spring and Fall creek diversion structures. At Spring Creek, there is a seven-fold increase in catch rates upstream of the diversion compared to downstream of the diversion. They view this as compelling evidence that the project is influencing redband trout densities in the downstream reach because: (1) they are moving downstream in search of available habitat and a potentially high percentage are entrained in the diversion canal; (2) available habitat in the downstream reach is not available to upstream migrating fish because of the privately owned and operated diversion structure; and/or (3) flows in the reach downstream of the Spring Creek diversion are not suitable to support similar densities of trout as are found upstream of the

diversion. Blaming this disparity on non-project diversions does not seem justifiable, nor does perpetuating project impacts to the system because other impacts are occurring in the watershed. Plainly some portion of the fish caught in Spring Creek canal were destined for Spring Creek downstream of the diversion dam. They conclude that sampling results in both Spring and Fall creeks suggest that ladders and screens are needed to allow fish to colonize available habitat (especially at Spring Creek).

Response: Subsequent to the 10(j) meeting held in December 2006, Oregon Fish & Wildlife filed additional information on the unique genetics of rainbow trout in Jenny and Fall creeks, on the relative scarcity of good quality coldwater habitat, and on the location and size of other private diversions in Spring Creek. We also acknowledge that some entrainment of trout into the Fall Creek intake is likely occurring, and that mortality rates are likely to be quite high due to the high head and type of turbines at the powerhouse. As a result of these factors, we modified the Staff Alternative to include the provision of upstream and downstream passage at both diversions, consistent with the NMFS/Interior modified fishway prescription.

A-73 Comment: On page 3-278. lines 19-21, of the draft EIS, we state: "…there is no lake or reservoir habitat downstream of the (Iron Gate) dam that is suitable for Lost River or shortnose suckers, so there would be little, if any, benefit to improving spillway survival for these species." PacifiCorp (p. 3-39) comments that the same conclusion would also apply to any proposed juvenile bypass systems at Iron Gate dam.

Response: We modified the text in section 3.3.3.2.2, *Fish Passage*, of the EIS accordingly.

A-74 Comment: PacifiCorp (p. 3-39) comments that our analysis of the need for tailrace barriers at Iron Gate dam (page 3-278 of the draft EIS), which are recommended by Cal Fish & Game and Oregon Fish & Wildlife, should note that NMFS does not prescribe tailrace barriers at Iron Gate dam.

Response: We modified the text in section 3.3.3.2.2, *Fish Passage*, of the EIS accordingly.

Disease Management

A-75 Comment: Interior (p. 24 and 73) and NMFS (p. 52) state that the general trend toward warmer water temperature in the Klamath watershed does not necessarily mean that disease incidence and related mortality would increase and contribute to a continued decline in the fishery for fall-run Chinook salmon. They state that wild Chinook salmon outmigrants from spring creeks such as Fall and Bogus creeks, and the Shasta River would enter the mainstem primarily in February and March, thus minimizing exposure to elevated temperature regimes and disease risk. They state that the EIS needs to be revised to adequately analyze mainstem (below the project) conditions for disease on earlier migrating wild fish, rather than on primarily hatchery fish.

Response: Although juvenile fall Chinook salmon from tributaries may enter the Klamath River earlier than hatchery fish, Interior's own screw trap data from 1997 through 2000, shown in figure 3-47 of the draft EIS, show that the vast majority of both naturally produced and hatchery fall Chinook salmon smolts moved past the Big Bar sampling site in the lower Klamath River during July and August in all 4 years sampled (Schieff et al., 2001). Further, Interior's own pathologists estimated that 45 percent of all juvenile fall Chinook salmon that outmigrated from the Klamath River in 2004 were infected with *C. shasta*, 94 percent of the population was infected with *P. minibicornis*, and the high incidence of fish infected with both pathogens suggests that the majority of the *C. shasta*-infected juvenile Chinook salmon would not survive. Monitoring results in 2005 reported by Nichols (2005) indicate that infection rates of juvenile fall Chinook salmon with *C. shasta* increased to levels that exceeded 70 percent by late April, and infection rates for *P. minibicornis* ranged between 94 and 100 percent from late April through at least

mid-May. It is clear from Interior's own screw trap sampling data and pathology studies that substantial losses of both hatchery and wild fall Chinook salmon are occurring on a regular basis.

A-76 Comment: Interior (p. 74) and NMFS (p. 54) state that the draft EIS has too narrowly focused on hatchery fall run Chinook salmon outmigrants. They state that data from 2003 and 2004 show a peak for wild fish outmigrants occurring in late March or early April. They state that wild fall run fish from above Iron Gate dam (at least from the project reach) would likely exhibit similar timing. Coots (1954) found outmigrating Chinook salmon had left Fall Creek by the end of March, historically.

Response: We reiterate that Interior's own screw trap sampling data, shown in figure 3-47 of the draft EIS, indicate that the vast majority of both natural and hatchery produced fall Chinook salmon moved past the Big Bar sampling site during July and August in all 4 years that were monitored (1997 through 2000). Because Interior did not provide the 2003 and 2004 data, we cannot evaluate the basis for its statement regarding outmigration timing in those years. The Coots study documents the timing of emigration from Fall Creek, but not from the mainstem Klamath River. Fall Chinook salmon are known for their tendency to make use of rearing habitats as they move downstream, which frequently translates into a very gradual and protracted outmigration period.

A-77 Comment: Interior (p. 23) comments the draft EIS conclusion regarding disease problems in the Klamath River downstream of the project is based on observations for only late outmigrant fall-run Chinook salmon juveniles and is overstated. It states that it is inappropriate to take observations of disease for one run over a 2 year timeframe and apply this interpretation to other species and to earlier outmigrating fall Chinook salmon.

Response: Interior's own pathology reports indicate that substantial infection rates of outmigrating fall Chinook salmon occurred in at least 4 out of 5 years between 2001 and 2005. Foott et al. (2002) found that more than 40 percent of Chinook salmon smolts sampled from the lower Klamath River in 2001 had severe ceratomyxosis, and the incidence of *C. shasta* infection ranged from 29 to 43 percent in juvenile Chinook salmon collected in the Klamath estuary (Foott et al., 2002; Nichols et al., 2003). In 2002, Nichols et al. (2003) reported that 19 percent of marked Trinity River hatchery Chinook salmon smolts collected in the estuary were found to be infected with *C. shasta*. We reiterate the conclusion of Interior's pathologists that most juvenile fall Chinook salmon infected with *C. shasta* in 2004 were unlikely to survive. This conclusion related to fish infected with both *C. shasta* and *P. minibicornis*; however, because reported infection rates with *P. minibicornis* are typically very high during the summer months, the general conclusion that fish infected with *C. shasta* are likely to die appears to hold for other years as well. Finally, we note that Foott et al. (2004) conclude that "the high incidence of ceratomyxosis in Chinook salmon smolts collected from the Klamath River and estuary indicate that this parasitic disease is a major mortality factor for both hatchery and natural populations."

A-78 Comment: NMFS states (p. 41) that the draft EIS provides no clear indication that an increased prevalence of disease pathogens may affect other salmonid species, including the federally listed coho salmon. NMFS (p. 58 and 59), comments that additional information since 2004 is available that indicate coho salmon are susceptible to *C. shasta*, but less so than Chinook salmon. It notes that no disease issues have been raised regarding Pacific lamprey.

Response: Foott et al. (2004) reported collecting one moribund coho salmon juvenile near the mouth of Pecwan Creek in 2001 that was infected with *C. shasta*, and reviewed a laboratory study by Udey et al. (1975) which reported mortality rates of coho salmon ranging from 22 percent at 15°C to 84 percent at 20.5°C. For Chinook salmon, Foott et al. (2004) reported that the magnitude of exposure appears to have a stronger influence on disease severity than water temperature. If infection rates of coho salmon are also affected by the magnitude of exposure, it is clear that increased infection levels of Chinook salmon may

also increase infection rates of coho salmon, and that measures that are effective in reducing infection rates of Chinook salmon would also reduce the risk of mortality to coho salmon.

A-79 Comment: The draft EIS, on page 3-211, line 31, states that Klamath River steelhead appear to be resistant to *C. shasta*. Interior (pp. 71 and 77) and NMFS (pp. 51 and 61) comment that the EIS should state that, within the Klamath River system, steelhead trout are resistant to *C. shasta*.

Response: Although the record indicates that the Klamath strain of steelhead trout is considerably more resistant to *C. shasta* than other strains, we find no explanation in the record for why steelhead returns to Iron Gate Hatchery and to the Shasta River suffered precipitous declines in the late 1980s and early 1990s and have not recovered. We note that despite the reported higher thermal tolerance of Klamath steelhead, Scheiff (2001) reported that a large kill of juvenile salmonids observed in 2000 included both age 1 and age 2 steelhead. Until a causative factor for the decline in steelhead returns has been identified, the potential occurrence of disease-related losses of steelhead should not be ruled out.

A-80 Comment: Interior (p. 75) and NMFS (p. 58) state that the EIS should be revised to expand the analysis of stressful conditions to include other anadromous fish species, such as steelhead, coho salmon, spring-run Chinook salmon, and Pacific lamprey, as well as other years, such as 2006.

Response: We concur with Interior and NMFS that other anadromous fish species that outmigrate earlier in the year, including steelhead, coho salmon, and spring Chinook salmon, are less likely to be subject to stress from adverse water quality conditions, and thus likely to be less susceptible to disease. We modified the text in section 3.3.3.2.3, *Disease Management* to include this information. We also have not seen any information in the record to indicate whether existing conditions are stressful for Pacific lamprey, or whether they are susceptible to the same diseases as trout and salmon.

A-81 Comment: NMFS (p. 42) and Interior (p. 23) comment that 2005 is a poor year to use as an indicator for fall run Chinook salmon mortality. They note that analysis of Iron Gate flows for the years 1961-2005 shows that 2005 ranked 41st among the 45 years of record in terms of low flows. Only four other years of record were lower: 1981, 1991, 1994, and 1992. Low flows generally correspond with higher temperatures and thus increased incidence. In 2006, a high flow year, indications are that levels of *C. shasta* infection were delayed and remained low through early May.

Response: We concur with NMFS and Interior that low flows contributed to poor survival of outmigrating juvenile fall Chinook salmon from the Klamath River in 2005. In fact, FWS pathologists concluded that 45 percent of juvenile fall Chinook salmon outmigrating from the Klamath River in 2005 likely died from a dual infection of *C. shasta* and *P. minibicornis*.[6] It is reasonable to conclude that continued losses of this magnitude are likely to result in future closures or restrictions of the west coast salmon fishery. We also concur that the lower rates of mortality observed in 2006 were related to the much higher flows that occurred that year. It is clear from the record, among measures that could be implemented in the near term, a substantial increase in flow during the migration season has the greatest potential for alleviating disease losses of fall Chinook salmon However, PacifiCorp does not have the ability to augment flows downstream of Iron Gate dam for extended periods of time.

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[6]Nichols and Foote (2005) state: "Expanding from trap efficiency data, we estimated that 45 percent of the population was infected with *C. shasta* and 94 percent of the population was infected with *P. minibicornis*. The high incidence of dual myxozoan infection (98 percent of *Ceratomyxa* infected fish), and associated pathology suggests that the majority of the *C. shasta* infected juvenile Chinook would not survive."

A-82 Comment: Interior states (p. 24) that the draft EIS does not adequately analyze all approaches to reducing the incidence of disease downstream of Iron Gate dam and that flow management may have a positive influence on fall Chinook salmon disease in future years. It states that flow management remedies that disrupt the life cycle of the polychaete host for both *C. shasta* and *P. minibicornis* would potentially be included as license conditions.

Response: We fully agree with Interior that the available information indicates changes in flow management have substantial potential for controlling disease infection rates in the near term. Flow and disease monitoring data from 2004 and 2006 indicate infection and mortality rates might be reduced substantially if river flows were maintained at levels exceeding 3,000 to 4,000 cfs throughout the outmigration season. It also is likely that implementing a substantial flushing flow near the start of the fall Chinook salmon outmigration period could substantially reduce pathogen densities and subsequent infection rates. We note, however, that PacifiCorp's ability to manage flows downstream of Iron Gate dam is constrained by the small amount of active storage that is under its control and by the flow requirements specified in the BiOps on Reclamation's operating plans for the Klamath Irrigation Project. We also note that Reclamation is the only entity in this proceeding that controls enough storage capacity to implement flow management remedies likely to disrupt the life cycles of disease pathogens and their alternate polychaete hosts.

A-83 Comment: PacifiCorp (pp. 3-39 and 5-7) states that the relationship of flow to pathogen infection described on page 3-281, lines 36-37, of the draft EIS, is speculative. It notes that, from mid-March to the end of June 2006, the number of fish that tested positive for *C. shasta* remained below 20 percent, but the number of fish that tested positive for *P. minibicornus* ranged from 89 to 100 percent by June. PacifiCorp points out that, although flows in the Klamath River from April through June were above 3,000 cfs during 2006, the incidence of disease still increased.

Response: We conclude that the evidence from disease monitoring conducted from 2001 through 2006 clearly indicates infection rates with *C. shasta* and disease-related mortality tend to be lower in high flow years such as 2004 and 2006. We also concur that high rates of infection with *P. minibicornus* appear to occur late in the migration season, even in high flow years, but we note Interior's pathologist's report that the risk of mortality increases substantially when smolts are infected with both *C. shasta* and *P. minibicornus.*

A-84 Comment: Oregon Fish & Wildlife (p. 172) and the Water Board (pp. 7 and 8) state that development of a disease management plan as recommended by staff in the draft EIS may not prevent the further decline of fish populations. The draft EIS concludes that disease losses in the lower Klamath River have most likely contributed to the recent declines in the number of fall Chinook salmon, and have the potential to cause the population to drop further, unless actions are taken to reduce losses from disease. However, they state that there is no evidence that any of the staff-recommended measures would reduce the impact of diseases on anadromous fish, and that it is impossible to determine the environmental impacts or benefits of a plan that would be developed in the future. They note that a plan does not ensure that results will be achieved, but may only serve to defer decision making. Finally, they comment that Commission staff should develop alternatives that avoid or minimize the adverse impacts of disease from the project.

Response: Our intent in listing 12 potential measures in the draft EIS for consideration as part of a disease management plan was to stimulate input from stakeholders on approaches that might be implemented in the near term to prevent the collapse of the Klamath fall Chinook salmon fishery. We recognize other stakeholders in this proceeding have considerable expertise instrumental in the development and refinement of measures that could be implemented as part of a disease management plan; and participation by other entities, especially Reclamation, would be required to implement any

substantive flow-related measures. We cannot force the other stakeholders to participate in such a plan, but we can require PacifiCorp to consult with stakeholders to explore the role PacifiCorp can and should play in a cooperative approach to addressing disease issues in the lower Klamath River.

A-85 Comment: Quartz Valley Indian Reservation (p. 37) states that some of the measures that we suggest on page 3-287 of the draft EIS could be considered for evaluation in the disease management plan have the potential for serious adverse effects. For example, dragging a chain over the riverbed to dislodge attached algae would likely release nutrients downstream, which if done during the algal growing season, could stimulate the growth of attached algae. It would do nothing for the benthic organic sediment that also is a preferred host polychaete habitat (Stocking, 2006). Similarly, chemical control has a high potential for adverse unexpected reactions. Rather than developing disease-resistant stocks, the priority should instead be toward maintaining existing natural genetic diversity. The tribe recommends that efforts not be directed at symptoms, but on efforts to reduce the river's nutrient burden, including the removal of dams.

Response: As indicated in previous responses, our intent in listing 12 potential measures in the draft EIS for consideration as part of a disease management plan was to stimulate input from stakeholders on approaches that might be implemented in the near term to prevent the collapse of the Klamath fall Chinook salmon fishery. We recognize other stakeholders in this proceeding have considerable expertise instrumental in the development and refinement of measures that could be implemented and evaluated in a disease management plan, and participation by other entities, especially Reclamation, would be required to implement any substantive flow-related measures. Regarding our suggestion to use mechanical methods to remove attached algae, this measure would be enhanced if it were followed by a sustained flushing flow to flush dislodged algae from the river. We do, however, agree that monitoring would be required to determine whether this measure increases pathogen prevalence in downstream areas. Because we anticipate other measures such as dam removal, the installation of fishways, or measures to reduce nutrient burdens may take a number of years to implement, it also is prudent to pursue measures that can be implemented in the near term to reduce the risk posed by continued disease losses of outmigrating juvenile fall Chinook salmon.

A-86 Comment: NMFS (p. 43) and Interior (p. 25) state that the draft EIS asserts that "due to the urgency of the disease situation in the lower Klamath River, we also evaluate measures that would involve developing and implementing approaches for reducing the incidence of fish diseases downstream of Iron Gate dam through a disease monitoring and management plan." However, they state that no analysis is provided of the costs or timeframe for the disease monitoring and management plan versus dam removal or other mitigation. They also state that the impact of relying on the development and implementation of a disease monitoring and management plan could be decades of inaction or ineffectiveness associated with an increasing disease problem for Klamath River fall run Chinook salmon. The Quartz Valley Indian Reservation (pp. 41 and 42) states that it is extremely skeptical that a fish disease management plan would result in a substantial reduction in fish disease in the Klamath River, and that any such reduction would occur at a lower cost than dam removal.

Response: We revised the Staff Alternative to include the development and implementation of an integrated fish passage and disease management program, as described in sections 5.2.6, *Anadromous Fish Restoration*, and 5.2.7, *Fish Disease Management*. The program includes an aggressive schedule for assessing the extent of project effects on the incidence and severity of fish disease, and developing and implementing measures to address these effects. Under this program, PacifiCorp would work with a technical advisory committee to develop a Phase I implementation plan within 12 months after license issuance that would define studies and monitoring efforts that would be conducted over the following 3 to 4 years to determine the most effective approaches for providing fish passage and for addressing project effects on fish disease.

After critical uncertainties related to fish passage and disease management have been fully addressed, PacifiCorp would work with the advisory committee to develop a Phase II implementation plan for Commission approval that would describe the schedule and approach for implementing fish passage, disease management, monitoring, and study efforts to be continued into the future, and provisions for implementing adaptive management based on monitoring and study results. The scope and cost of disease control measures that would be implemented by PacifiCorp under the Phase II implementation plan would be dependent on the extent of project effects that are identified in Phase I studies.

One of the studies included in Phase I would involve drawing down Iron Gate and Copco reservoirs to gain information on the effects of reservoir storage on downstream water quality and disease incidence. The drawdown period also would provide information on the effectiveness of a pulse flow in reducing the severity of fish disease problems during the outmigration of juvenile fall Chinook salmon. If a pulse flow is found to be effective, it could be implemented as an ongoing measure using available storage in the project reservoirs or in combination with water released through Upper Klamath Lake.

A-87 Comment: Interior (p. 25) and NMFS (pp. 42-43) comment that the draft EIS does not provide any analysis or examples from other river systems showing that a disease monitoring and management plan would be an effective remedy. The EIS needs to include analysis of the flows necessary to dislodge attached algae and expedite fish movement, and the spill flows necessary to increase DO levels and reduce fish stress during fall Chinook salmon outmigration or spawning. Interior, NMFS, and Cal Fish & Game (p. 32) state that the EIS should compare the costs of dam removal or other mitigation with the costs of continued disease impacts on fall run Chinook salmon, the costs of potential commercial Chinook salmon fishery closures, and losses to other associated fisheries. Interior and NMFS recommend that the EIS be revised to assess whether dam removal or implementation of the staff-recommended disease monitoring and management program would be the most likely approach to prevent a further decline in the fishery for fall Chinook salmon.

Response: We revised the Staff Alternative to include an integrated fish passage and disease management program that includes an aggressive approach to (1) restore anadromous fish to habitat upstream of Iron Gate dam; (2) determine project effects on water quality, microcystin levels, and the distribution and abundance of disease pathogens; and (3) to identify and implement measures to improve fish passage and to reduce the incidence of water quality and disease-related mortality of anadromous fish. The program would improve our understanding of the project's role in disease losses, which measures would be effective in reducing those losses, and of whether dam removal would improve or exacerbate water quality and disease-related losses within and downstream of the project. Without this information, it is not possible to accurately assess the effects that dam removal would have on potential benefits of dam removal. Also, without this information, it is not possible to compare the costs of dam removal to the costs of disease impacts on fall run Chinook salmon, on commercial Chinook salmon fishery closures, and on losses to other associated fisheries.

A-88 Comment: Quartz Valley Indian Reservation (pp. 41 and 42) states that section 5.2.7, *Fish Disease Management*, should be revised to (1) reflect the influence of project operations at the bypassed and peaking reaches on water quality, which in turn influences fish disease prevalence; and (2) note that *Microcystis* is not just a public health threat, but a threat to fish health.

Response: We modified the text on pages 3-286 and 5-38 of the draft EIS to indicate toxins produced by *Microcystis* algae are likely to contribute to fish stress and disease, and may directly compromise fish health. We also modified this EIS to include analysis of the effects of project operations on nutrient processing in the peaking and bypassed reaches.

A-89 Comment: PacifiCorp (pp. 2-6, 3-42, and 5-7), commenting on our recommendation 17S (which provides for the development and implementation of a cooperative fish disease risk monitoring and management plan), maintains that such a plan should not be the responsibility of any one entity and the proper framework for dealing with this issue is in a basin-wide forum such as the Conservation Implementation Program, which is being developed by Reclamation. PacifiCorp would be a willing participant in such a process.

Response: In light of current knowledge regarding disease problems and how they may be exacerbated by the project, we consider it appropriate to recommend a license measure that would help expedite the determination and implementation of appropriate and effective measures to alleviate the disease situation in the lower Klamath River. We do not consider reliance solely on the Conservation Implementation Program, which would not be within the Commission's jurisdiction, to be an appropriate approach for addressing fish disease issues related to the project.

A-90 Comment: NMFS (p. 42) and Interior (p. 73) state that the adult fish kill in 2002 was due to multiple causes and was unlike any mortality event ever seen before or since on the Klamath River. They note that there is no evidence that adult Chinook salmon die-offs in the Klamath River are associated with any long-term water temperature or disease trends.

Response: Although the adult fish kill in 2002 was caused by a fairly unique combination of factors, we also consider it reasonable to assume the risk of another adult fish kill would increase, if the long-term trend of increased water temperatures continues.

A-91 Comment: The Quartz Valley Indian Reservation (pp. 35 and 36) suggest that we add a fourth factor to the list of project-related factors that contribute to conditions that foster disease losses in the lower Klamath River: "algae from blooms in project reservoirs are flushed downstream where they settle and provide habitat for the polychaete alternate host for *C. shasta* and *P. minibicornis*." Suggested text for an explanatory paragraph is provided, indicating that, as phytoplankton released from Iron Gate dam die, they become organic matter. It notes that Stocking (2006) found that fine benthic organic matter was the primary habitat for polychaete host for the two fish pathogens listed above.

Response: We revised section 3.3.3.2.3, *Disease Management*, accordingly. We note, however, that while Stocking (2006) found high densities of the *M. speciosa* polychaete in fine benthic organic material, he also found this habitat only persisted in low velocity areas such as at the head of project reservoirs or in pools, while polychaete populations on *Cladophora* were more resistant to higher water velocities. Stocking also noted that growths of *Cladophora* appear to trap and retain fine benthic organic matter that serves as food for *M. speciosa*.

A-92 Comment: PacifiCorp (pp. 3-17, 3-18, 3-20, 3-21, 3-41, 3-42, 5-4, and 5-5) disagrees with our suggestion on pages 3-145 and 3-148 and in sections 3.3.3.2.3, *Disease Management*, 3.3.3.2.5, *Anadromous Fish Restoration*, and 5.2.4, *Water Quality Management*, of the draft EIS that project reservoirs may cause nutrient enrichment that contributes to increased *Cladophora* growth that in turn provides habitat for the *C. shasta* polychaete host. PacifiCorp concludes that, without project reservoirs, the abundance of *Cladophora* would be much greater because the nutrient-enriched waters from Upper Klamath Lake would travel much faster and further through the river system in the absence of reservoirs.

Response: We recognize that the relationships between nutrient cycling, algae growth, and intermediate parasite host microhabitats is complex; however we remain committed to our assessment of the current literature and knowledge regarding these topics as presented in this EIS. Regarding nutrient enrichment, Kann and Asarian (2005) reported that Copco and Iron Gate reservoirs can act as both sources and sinks for nitrogen during the algal growing season, which we discuss in section 3.3.2.2.2. When the reservoirs

act as sources, nitrogen is supplied downstream stimulating growth of attached algae and other aquatic vegetation. Kann and Asarian (2006) reported that during the June through September period, Copco and Iron Gate reservoirs are providing habitat conditions that foster increased overall phytoplankton biovolume comprised largely of nitrogen-fixing cyanophyte species which as the authors point out is important ecologically because these species have the potential to introduce additional nitrogen into the Klamath River system. As for *Cladophora*, we describe its competitive advantage in nutrient enriched waters, such as those released from project reservoirs, in section 3.3.2.2.2 as well as its relationship to fish pathogens. Stocking and Bartholomew (2004) and Stocking (2006) identify *Cladophora* as important habitat for the polycheate host for both *C. shasta* and *P. minibicornis*. As such we maintain that controlling nutrients would go a long way in improving various aspects of water quality and assist in controlling attached algae growth in the Klamath River. We describe nutrient control in section 3.3.2.2.2 *Project-wide Water Quality Management*.

Regarding the distribution of *Cladophora* under a without project scenario; we agree that the distribution of attached algae would likely change, in that it would exist in greater concentrations closer to the source of nutrients (as discussed in section 3.3.2.2.2, *Dam Removal to Enhance Water Quality*) where nutrient assimilation processes could occur higher in the watershed. However, without the reservoirs, nutrient dynamics in the Klamath River would be altered. Consequently, making predictions about where and how much *Cladophora* colonization would occur would be difficult. One likely outcome is that as nutrients are assimilated in the river, nutrient concentrations would diminish in a downstream manner where concentrations become less favorable to whatever competitive advantage *Cladophora* has in nutrient enriched waters so that other attached algae and submergent and emergent vegetation could compete. Another likely outcome is in the absence of J.C. Boyle dam, peaking flows would no longer exist providing a more stable flow regime under which *Cladophora* could thrive.

A-93 Comment: PacifiCorp (pp. 3-41, 3-42, 5-5, and 5-6) disagrees with our conclusion on page 3-285, lines 25-27, and section 5.2.4, *Water Quality Management*, of the draft EIS that the project contributes to water quality conditions that increase the stress of juvenile and adult migrants, thereby increasing their susceptibility to disease. PacifiCorp states that there are no project-related adverse effects on anadromous fish that use the reach below Iron Gate dam at the time of migration, spawning, and egg incubation from thermal lag during the spring and slightly warmer during the fall (pp. 3-43 to 3-47). Consequently, PacifiCorp finds that our discussion of the benefits associated with water quality management in section 5.2.4 and potential mainstem dam removal and associated water temperature benefits on pages 3-289 and 3-290 of the draft EIS, is flawed. It concludes that the project-related temperature regime downstream of Iron Gate dam is beneficial to anadromous salmonids that use this portion of the Klamath River.

Response: As stated on page 3-289 of the draft EIS, the thermal lag caused by the project increases temperature-induced stress of adult fall Chinook salmon, and may delay fall Chinook salmon spawning in the fall and emergence in the spring. PacifiCorp's own analysis in its comments on the draft EIS indicates that elevated fall temperatures may cause an incremental increase in egg mortality of up to 5 percent. In the spring, the lag causes water temperatures to be lower than optimal for growth of newly hatched fry from February through April, which may contribute to delayed emigration and increased exposure to adverse temperatures during the summer. As acknowledged on page 3-290 of the draft EIS, the project likely benefits outmigrating juvenile Chinook salmon by reducing summer water temperatures, although we also note that a reduction in cooling at night may have adverse effects. Finally, the project contributes to lowered DO levels downstream of Iron Gate dam for most of the year, but especially from August through November (see figure 3-38 in the draft EIS), which may adversely affect adult fall Chinook salmon. In addition, algae blooms that occur in the project reservoirs during the spring and summer contribute to wide fluctuations in DO levels and pH, and potentially toxins (from *Microcystis* blooms), in the mainstem Klamath River downstream of Iron Gate dam. These fluctuations and toxins are

likely to increase stress and disease susceptibility of juvenile fall Chinook salmon rearing and migrating within the upper reaches of the Klamath River between Iron Gate dam and the Shasta River.

A-94 Comment: On page 5-42, lines 10-14, of the draft EIS, we state: "…effects of the project on water quality conditions and disease incidence, in combination with a basin-wide warming trend, are causing substantial losses of smolts during outmigration, which limits the number of adults that the hatchery contributes to commercial, recreational, and tribal fisheries." PacifiCorp (p. 5-11) comments that it is unreasonable to expect PacifiCorp to mitigate for change in the basin climate due to global warming, and this statement should be eliminated from the EIS. In addition, PacifiCorp states that the draft EIS presents no data to support the assertion that project operations result in an increase in disease incidence in the lower river and our hypothesis is based on speculation. PacifiCorp comments we should either eliminate this assertion or provide the analysis on which it was based. Finally, PacifiCorp suggests if warmer stream temperatures increase disease severity, as is claimed in the draft EIS, then project operations that reduce disease impacts, such as the cooling of river temperatures during April through June, should be discussed in the EIS.

Response: We consider basin temperature trends in our cumulative effects analysis. We do not imply that PacifiCorp should mitigate for basin warming trends, but note that these trends put the anadromous fisheries at greater risk and compound the project effects that likely contribute to stress and the incidence of fish diseases. We describe the project effects that are likely to contribute to fish stress and the incidence of disease in detail in section 3.3.3.2.3, *Disease Management*. On page 3-285, lines 22-23, of the draft EIS, we state the project operations "likely" contribute to conditions that foster losses of fish from disease. We acknowledge that additional research to definitively identify causes of salmon disease in the lower Klamath River is needed. However, there is sufficient information available to establish a likely link to project operation. We added the word "likely" to the indicated text in section 5 to be consistent with our analysis in section 3.3.3.2.2. We also added text, to section 3.3.3.2.3, stating that the project's effects on water temperatures likely reduce fish stress and disease susceptibility for early migrants. As part of the integrated fish passage and disease management program, we describe studies that would provide further insight into the relationship between project effect and the incidence of fish disease, and of measures that could be implemented to address any adverse effects**.**

A-95 Comment: PacifiCorp (p. 3-41) disagrees with our conclusion on page 3-285, lines 23-24, of the draft EIS, that the existence of the project likely contributes to conditions that foster disease losses in the lower Klamath River by increasing the density of spawning adult fall Chinook salmon downstream of Iron Gate dam. It notes that, as we point out in table 3-47 of the draft EIS, most of the fall Chinook salmon production from below Iron Gate dam comes from Bogus Creek, which is not affected by the project, and a relatively low proportion comes from the mainstem Klamath River. PacifiCorp states that the relationship of spawning density to disease infection prevalence is a hypothesis not yet tested.

Response: As shown in table 3-48 in the draft EIS, between 24 and 61 percent of the fall Chinook salmon redds observed between 1993 and 2002 in the Klamath River were found in the first 4 miles downstream from Iron Gate dam. This pattern is consistent with the hypothesis stated by Stocking (2006) that the high pathogen densities that have been observed within the first 50 miles downstream from the Iron Gate dam are caused by the release of spores from salmon when they die after spawning. Although we are not aware of any information on pathogen densities in Bogus Creek, this seems to be an area that would merit investigation as part of the integrated fish passage and disease management plan. If pathogen densities observed in Bogus Creek are low despite the high density of fall Chinook salmon that spawns there, additional monitoring could provide useful information on the pathways by which *C. shasta* is transmitted, and could lead to a better understanding of potential disease management options.

A-96 Comment: Interior (pp. 72 and 76) and NMFS (pp. 60-61) indicate that our concern regarding disease risks associated with anadromous fish reintroduction, referenced on pages 3-263, line 32, and table 3-72, of the draft EIS, is unfounded. They state that the concern regarding potential introduction of the *Infectious Hematopoietic Necrosis* (IHN) virus has been addressed by the ALJ's findings: the existence of the virus IHN in the Klamath River system is exceedingly rare and because the majority of pathogens currently found in the lower basin also exist in the upper basin of the Klamath River system, a logical conclusion is that migration of anadromous fish would not be a significant factor contributing to disease of resident fish. The EIS needs to be revised to reflect these findings and adequately analyze the benefits of volitional fishways.

Response: Although the ALJ concludes that the migration of anadromous fish would not be a significant factor contributing to disease of resident fish, we maintain there is some level of risk of disease transmission associated with providing fish stocks that are currently restricted in the lower watershed with access into the upper watershed. However, we do not consider this risk a basis for foregoing appropriate anadromous fish restoration upstream of Iron Gate dam.

A-97 Comment: PacifiCorp (pp. 3-39, 3-40, and 3-42), commenting on the agencies recommendations to develop disease management plans, summarized on page 3-282 of the draft EIS, refers to the information presented in the ALJ findings which indicates that strategies for minimizing disease risk for restoring anadromous fish upstream of Iron Gate Hatchery are not needed.

Response: One of the findings of fact cited by PacifiCorp is: "To the extent that migrating anadromous fish carry a unique highly virulent pathogen, disease management protocols could be used as is customary." We concur with PacifiCorp's argument that the record demonstrates the agencies already have well developed disease management protocols that could be used to screen fish collected for trap and haul or in a trapping facility associated with volitional fish passage facilities. We concur with PacifiCorp that the agencies should be able to provide suitable disease monitoring protocols that can be used to limit the potential for introducing virulent diseases through the passage of adult anadromous fish to areas upstream of Iron Gate dam. However, it would be PacifiCorp's responsibility to document and implement any disease management protocols required by the fisheries management agencies that pertain to trap and haul or other measures involving the handling or confining of fish.

A-98 Comment: PacifiCorp (p.3-41) interprets the ALJ finding of fact that *C. shasta* has been detected in the lower Williamson River and in areas below Iron Gate dam in nearly equal levels as proof that project operations do not influence the amount of this pathogen that occurs in the lower Klamath River, but that the prevalence is determined by natural processes. PacifiCorp (p. 5-11), comments that anadromous fish reintroduced to habitat upstream of the project would be exposed to the parasite for a longer period than lower river populations. This could result in increased disease risks and higher mortality rates to upper basin populations, thereby increasing the risk of program failure. Studies to address this potential should be undertaken to determine whether a trap and haul alternative for restoration could be a more effective solution to managing disease risk.

Response: Although OSU (2004) reported that the Williamson River registered the second highest prevalence of spores of the 19 sites evaluated, parasite loads reported by Stocking (2006) were consistently higher in the first 50 miles downstream from Iron Gate dam than they were at any locations in the upper Klamath River. Although Stocking (2006) also detected high polychaete infection rates near the mouth of the Williamson River, no other area upstream of Iron Gate dam approached the *C. shasta* infection rates measured in the lower Klamath River. Accordingly, we do not agree that salmonids rearing in the upper watershed would suffer more exposure than those rearing in the lower Klamath River. We do agree, however, that a trap and haul approach could reduce disease exposure during the juvenile outmigration, which we listed as a potential benefit of PacifiCorp's alternative fishway prescription in

table 3-72 of the draft EIS. We modified the text in section 3.3.3.1.4 to include new information on the distribution and prevalence of *C. shasta* from Stocking (2006).

A-99 Comment: The draft EIS on pages 3-285, lines 19-21, and 3-291, lines 26-28, states that efforts to restore passage of anadromous fish to areas upstream of the project may provide little or no benefit if disease problems in the Klamath River downstream of the project are not effectively addressed. Quartz Valley Indian Reservation (p. 35) states that it only partially agrees with this statement, because fish ladders would reduce crowding and associated disease risk by expanding the availability of spawning habitat, and restoration of anadromous fish by dam removal would improve water quality and reduce associated pathogen loads.

Response: Restoring access to upstream reaches could help reduce the incidence of fish disease by reducing crowding of spawners downstream of Iron Gate dam, and dam removal would likely reduce the incidence of disease through improvements in water quality. Water quality improvements would include the moderation of fluctuations in DO, pH, and ammonia through natural aeration from the turbulent passage of water in areas of higher gradient currently inundated by reservoirs and elimination of Copco and Iron Gate reservoirs and associated anoxic hypolimnia and algal blooms. We discuss these potential benefits on page 3-289, lines 26-42, of the draft EIS. However, as noted previously, we are concerned that the implementation of fish passage or dam removal may be held up for a number of years, and immediate action may be needed to prevent a substantial decline in the fishery for fall Chinook salmon.

A-100 Comment: Interior (p. 75) and NMFS (p. 59) state that figure 3-80 of the draft EIS, which shows the percentage of Chinook salmon collected in a screw trap on the lower Klamath River showing evidence of disease infection, should be revised to include weekly sample sizes with bars for context.

Response: We do not have access to weekly sample sizes in the record for this proceeding. As indicated in the caption for this figure, the figure was taken from KFHAT (2005).

A-101 Comment: Interior (p. 75) and NMFS (p. 58) point out that, on page 3-286, line 15, in our discussion of disease management in the draft EIS, we refer to tables 2.2-2 and 2.2-5. These tables do not exist in the draft EIS.

Response: We corrected the text accordingly. The text should have referenced tables 3-68 through 3-70.

A-102 Comment: On page 3-286, lines 15-16, of the draft EIS, we state: "…water temperature and DO levels predicted by PacifiCorp's water quality model indicate that stressful conditions for juvenile fall Chinook salmon generally occur starting in late May,…" Quartz Valley Indian Reservation (pp. 36 and 37) states that, as a general rule, whenever field data are available they should be used in place of model outputs. In most years since 2000, extensive water quality data have been collected using multi-parameter automated probes at Iron Gate dam and other downstream sites. We should review this rich dataset to see if it provides the same answer as PacifiCorp's water quality model.

Response: We modified the text in this section to include a figure showing water temperatures associated with fish kills observed during screw-trap sampling conducted at Big Bar in 1997 and 2000. We also added continuous temperature and DO data to section 3.3.2 for Seiad Valley and Weitchpec for 2000 thru 2003.

A-103 Comment: Interior (p. 75) and NMFS (p. 59) state that lines 1-3, of page 3-287, of the draft EIS, should read: "Development of an effective disease management plan may be essential to prevent further decline of the populations of Klamath Chinook and coho salmon."

Response: We modified the text accordingly.

A-104 Comment: Interior (p.96) and NMFS (p. 66) note that, on page 5-38, lines 10 and 43, of the draft EIS, the Disease Management Section is numbered 3.3.3.2.3, not 3.3.3.2.5.

Response: We revised the text accordingly.

Dam Removal

A-105 Comment: Interior (p. 75) and NMFS (p. 59) note that the last part of the sentence on page 3-289, lines 26-27, of the draft EIS, "Removal of one or more of the mainstem dams could reduce the incidence of fish disease in the Klamath River downstream of Iron Gate dam through several mechanisms" should be changed to "several potential mechanisms."

Response: We revised the text accordingly.

A-106 Comment: In our discussion of the effects of mainstem dam removal on page 3-289 of the draft EIS, we state the following: "Restoring access to these reaches for anadromous fish would allow adult fall Chinook salmon to distribute over a greater length of the river, reducing crowding and the concentration of disease pathogens that currently occur in the reach between Iron Gate dam and the Shasta River." We make a similar statement in section 5.2.21, *Dam Removal*. PacifiCorp (pp. 3-47, 3-48, and 5-18) states that this assumption would only be true if removal of Iron Gate and Copco No. 1 dams reduces fish abundance below Iron Gate dam. PacifiCorp asks that, if *C. shasta* has been found to be a serious problem at 145 fish per mile (the spawner concentration that we used for the mainstem Klamath River downstream of Iron Gate dam), why would it decrease when densities are at the 428 fish per mile level assumed for upstream of Iron Gate dam? PacifiCorp considers it far more likely that dam removal would increase the incidence of disease.

Response: In addition to spawner density, we discuss a number of project effects that are likely to contribute to the incidence of fish disease in section 3.3.3.2.3, *Disease Management*. These effects include increased water temperature starting in the late spring or early summer, wide swings in DO, pH, and ammonia levels associated with algae blooms in project reservoirs, and conditions that favor the development of attached algae, including effects on nutrients and the development of a stable substrate from streambed armoring. We acknowledge, however, that effects of the project on water quality conditions, pathogen levels, and the incidence of fish disease is complex. In section 3.3.3.2.5, *Anadromous Fish Restoration*, of this EIS we present an integrated fish passage and disease management program that is designed to address critical uncertainties regarding alternative approaches for restoring anadromous fish and for controlling fish diseases in the Klamath River, and implementing effective measures in a timely manner.

A-107 Comment: PacifiCorp (pp. 3-47, 3-48, and 5-18) points out that in footnote 65 (page 3-291) of the draft EIS, we imply that the river that would be exposed with dam removal would support 428 fish per mile, which is more than what is currently supported in the 13-mile reach downstream of Iron Gate dam (estimated by PacifiCorp to be from 44 to 145 fish per mile). PacifiCorp further indicates that to reduce fish densities in the 13-mile reach downstream of Iron Gate dam, a substantial number of the 1,881 fall Chinook salmon that currently spawn in this area would need to move upstream and spawn in the newly opened mainstem habitat. If this happens, then the increase in fall Chinook salmon that we estimate on page 3-291, lines 5-8, of the draft EIS, would be far less than we imply, since the action would simply shift fish production upstream.

Response: If effective approaches to improve water quality conditions, control fish disease downstream of Iron Gate dam, and restore anadromous fish production in upstream habitats are identified and implemented, it is likely that the total run size of fall Chinook salmon would increase over time from current levels. If this were to occur, the number of fall Chinook salmon that are produced from habitat downstream of Iron Gate dam would not necessarily decrease as passage to and production from upstream habitat is restored. We modified the text in the cited section to acknowledge that many factors influence adult returns. We also note in that section that our estimates assume that water quality and disease-related losses in the lower Klamath River migratory corridor are reduced from current levels as a result of removing the dams or by actions (including actions that may be taken by other parties) to reduce nutrient loading and water temperatures or to improve streamflows during the migration season.

A-108 Comment: PacifiCorp (pp. 3-49 and 3-50), commenting on pages 3-290 and 3-291 of the draft EIS, concludes that the spawner density used in our dam removal analysis is inappropriate. It states that we should clarify that the production numbers associated with dam removal that we present reflect spawning area capacity and not estimates of resulting production. Our estimates of fall Chinook salmon production do not account for passage survival through the project, lower Klamath River, or harvest, all of which would substantially reduce fall Chinook salmon productivity. PacifiCorp provides information to support its alternative approach to estimating the number of spawners per mile and suggests that table 3-47 in the draft EIS supports their conclusion that fall Chinook salmon production would be much less than we estimate with dam removal.

Response: Although we recognize that multiple factors could affect future returns of anadromous fish species, we maintain that our estimates of fall Chinook salmon production potential in habitat that is currently inundated by Copco and Iron Gate reservoirs is reasonable. By all accounts, the Klamath River is a highly productive system that historically produced very large runs of Chinook salmon. If access to anadromous fish habitat upstream of Iron Gate dam is restored, it is reasonable to assume that watershed restoration efforts would increase from current levels, and would help boost anadromous fish production within and downstream of the project. Our estimates of Chinook salmon production do assume, however, that effective means to address disease problems in the lower river are identified and implemented.

A-109 Comment: Interior (p. 75) and NMFS (p. 59) state that page 3-289, lines 35-39, of our draft EIS asserts that, if the lower dams are removed, the spread of *Cladophora* would extend upstream into newly exposed stream sections due to their typical prevalence within areas that are high in nutrient load. This assertion seems to assume that poor water quality conditions would continue to exist within the project reaches after dam removal, and *Cladophora* distribution would extend into this reach over time. However, water quality is likely to be improved due to the lack of impounded water, the influx of cold spring water seepage in the area corresponding to upper Iron Gate reservoir, and the cold water inflow from Jenny and Fall creeks. Also, the areas currently inundated by the dams likely contain a sediment surplus, unlike the heavily armored, sediment "starved" section of the river downstream of Iron Gate dam. *Cladophora* would be less likely to establish permanent colonies in the highly mobile bedload located upstream of the dams. Therefore, Interior and NMFS disagree that removing the lower dams would facilitate *Cladophora* migration upstream into currently inundated areas; they find that the topic needs further study prior to making a definitive statement on the matter.

Response: The indicated text in the draft EIS does not suggest that, with dam removal, the zone of the Klamath River downstream of Iron Gate would expand to upstream locations. We do state that the zone of *Cladophora spp*. abundance would likely be displaced upstream, becoming less abundant near Iron Gate dam but more prevalent closer to the source of the nutrients. Based on information provided in GEC (2006), the period of substantial bed mobility following dam removal would likely only last up to 120 days following removal of either Copco No. 1 or Iron Gate dams, after which the relatively hard substrate favored by *Cladophora spp*. for colonization would likely be present at the former reservoir sites.

Whether the riverbed at the former reservoir sites are actually colonized by *Cladaphora spp.* is subject to a number of complex variables which are not likely to be accurately predictable.

A-110 Comment: Quartz Valley Indian Reservation (p. 37) states that our discussion of the effects of mainstem dam removal on fish disease on page 3-289 of the draft EIS overlooks the important point that J.C. Boyle dam affects downstream water quality not just with its relatively small reservoir, but by enabling bypassed and peaking reach operations. This affects fish disease potential, and without J.C. Boyle dam, this effect would cease.

Response: We modified the text in section 3.3.3.2.4, *Dam Removal or Decommissioning*, to indicate that without J.C. Boyle dam, minimum and mean water temperatures from April through October, within the bypassed reach, but upstream of the area of spring accretion, would decrease, but downstream of the springs, daily minimum mean and maximum water temperature would increase. This expected increase in water temperature would decrease the suitability of this habitat for salmonids and potentially increase disease susceptibility. We also acknowledge that removal of J.C. Boyle dam would be expected to increase nutrient uptake by attached algae because of increased flow volume in the bypassed reach and reduced flow fluctuations in the peaking reach.

A-111 Comment: PacifiCorp (pp. 3-48, 3-51, and 5-18), commenting on pages 3-290 and 3-297, and section 5.2.21, *Dam Removal*, of the draft EIS, where we itemize the influence of removing one or more mainstem dams on anadromous fish restoration, states that we speculate that project reservoirs increase nutrients downstream of Iron Gate dam, which leads to increased periphyton production and associated fish pathogens. PacifiCorp concludes that dam removal would have the opposite effect; the quantity of nutrients in the lower river would be far greater than currently exists, resulting in increased periphyton production. PacifiCorp states that we should add this degradation to downstream water quality as an adverse effect of dam removal on aquatic resources, on pages 3-292 and 3-297 of the draft EIS.

Response: We acknowledge that effects of the project on water quality conditions downstream of the project are complex, but we also conclude that the project has the potential to increase nutrient levels downstream of the project reservoirs during some time periods, including between June and September. The information that would be collected during our staff-recommended integrated fish passage and disease management program, described in this EIS, would assist with determining the effects of project reservoirs on downstream water quality conditions. This information is designed to address critical uncertainties regarding alternative approaches for restoring anadromous fish and for controlling fish diseases in the Klamath River, and implementing effective measures in a timely manner.

A-112 Comment: On page 3-290, lines 31-40, of the draft EIS, we indicate that removal of one or more dams would improve the prospect of anadromous fish restoration because associated disease reduction in the lower river migratory corridor would allow additional time for critical uncertainties regarding the feasibility of anadromous fish restoration to be addressed. PacifiCorp (p. 3-48) states that the critical uncertainties are the reason why an adaptive approach to anadromous fish restoration is needed, rather than the removal of one or more dams. The city of Yreka (p. 6) urges avoidance of bias with respect to dam removal alternatives without effective evidence supporting that the health of the river, and the fisheries within it, would benefit or substantially recover after the removal of dams.

Response: It would be prudent to address critical uncertainties about fish passage and disease incidence before a decision is made to construct fish passage facilities at Copco No. 1 or Iron Gate dams or to remove any of the mainstem dams. We emphasize, however, the need for prompt action to determine what measures would be effective for controlling disease losses of outmigrating juvenile fall Chinook salmon.

A-113 Comment: Interior (p. 75) and NMFS (p. 59) suggest that we change the sentence on page 3-289, line 46, of the draft EIS, that reads "This (referring to the reduced thermal lag in the spring that would likely occur with removal of one or more dams), in turn, would result in earlier emergence and growth, and encourage earlier emigration" should be changed to "would likely result."

Response: We made the recommended text edit in section 3.3.3.2.4, *Dam Removal or Decommissioning*.

A-114 Comment: Quartz Valley Indian Reservation (p. 37) suggests we add the following sentence to our discussion of the benefits of eliminating thermal lag by dam removal on page 3-289 of the draft EIS: "Because temperature is a primary influence in growth of attached algae (Biggs 2000), the thermal lag extends the growing season for attached algae, resulting in degraded pH and dissolved oxygen conditions in the late summer and early fall."

Response: We modified the text in section 3.3.3.2.4, *Dam Removal or Decommissioning*, indicating that water quality effects associated with algae growth would likely shift, with increased growth in the early summer and reduced growth in the late summer and early fall.

A-115 Comment: Interior (p. 75) and NMFS (p. 59) suggest that the sentence on page 3-290, lines 7-8, that reads "Restoring natural sediment transport processes (by removal of Iron Gate dam) would contribute to the scour of attached algae downstream of the current site of Iron Gate dam…" should be changed to "Restoring natural sediment transport processes would likely..."

Response: We made the suggested text edit in section 3.3.3.2.4, *Dam Removal or Decommissioning*.

A-116 Comment: Quartz Valley Indian Reservation (p. 38) states that our discussion of adverse effects of dam removal on aquatic resources on page 3-292 of the draft EIS should be updated to include the information in the California Coastal Conservancy 2006 study that indicates that the toxicity of the sediments in the lower four dams is very low; only a relatively small portion of the total stored sediment would erode in the event of dam removal, and the sediment would not cause downstream flooding.

Response: We updated the text in section 3.3.3.2.4, *Dam Removal or Decommissioning*, to include information from the 2006 California Coastal Conservancy study that was not available when the draft EIS was issued.

A-117 Comment: PacifiCorp (pp. 3-48, 3-49, 5-18, and 5-19), commenting on page 3-290, lines 41-45, and section 5.2.21, *Dam Removal*, of the draft EIS where we note that dam removal would increase the supply of downstream sediments, states that dam removal raises significant concerns regarding the downstream biological impacts due to sediment build-up behind the dams. PacifiCorp states that the California Coastal Conservancy sediment study results that were filed with the Commission after the draft EIS was issued focus on physical sediment deposition processes and do not address biological issues. There has been no consideration of the effects of overbank sediment deposition and fine sediment infiltration into gravel interstices, which could have significant impacts on aquatic habitat, the effects of increases in downstream turbidity and suspended sediment levels, the release of nutrients and other contaminants bound in the sediments, and channel incision and shifting in formerly impounded reaches of the river. PacifiCorp concludes that we have not sufficiently explored the considerable uncertainty over the quality of fine sediments accumulated behind the dam and the disposition and potential effects of those sediments under a dam removal scenario.

Response: We discuss the potential adverse effect of dam removal on aquatic resources in section 3.3.3.2.4, *Dam Removal or Decommissioning*, of the draft EIS. We noted in the draft EIS that in the near term, an increase in fine sediments can also be expected to reduce the quality of fall Chinook spawning

habitat downstream of Iron Gate dam, and we added text to this section indicating that substantial increases in turbidity levels could adversely affect the health and the food supply available to rearing salmonids. We also note in the same section that any adverse effects that occur to spawning fall Chinook salmon would affect only those that spawn in the mainstem Klamath, and not the majority of fall Chinook salmon that spawn in its tributaries. We recognize that additional sampling of sediments for contaminants would be needed to increase the assurance that any heavily contaminated sediments would be properly disposed. We expect that the need for and extent of any additional sediment contaminant testing would be determined through the decommissioning proceeding that would be required if any of the project developments were to be removed.

A-118 Comment: NMFS (p. 59) comments that page 3-291 of the draft EIS refers to the removal of one or more dams as eliminating losses of anadromous fish associated with reservoir and dam passage at the dams that are removed. This assessment is too narrowly focused on Iron Gate dam removal and purported lack of effective downstream passage for Chinook salmon smolts. NMFS comments the draft EIS overlooks the analysis done by Oosterhout showing that removal of all dams showed better returns of Chinook salmon than returns for trap and haul and volitional fish passage.

Response: We expanded table 3-72 to include evaluation of the benefits of a four-dam removal scenario on anadromous fish restoration. Compared to a two-dam removal scenario, we indicate that the four-dam removal alternative would restore a greater amount of inundated habitat, restore natural flows and sediment transport processes to all project reaches, and further reduce predation on outmigrating smolts. We also acknowledge that water quality benefits would likely be increased beyond what would occur under the two-dam removal alternative, but because of the complexity of nutrient dynamics in the Klamath River and project reservoirs, we cannot rule out the potential for some adverse effects due to dam removal. We note that the integrated fish passage and disease management program that we include in the Staff Alternative would address this and other uncertainties about the benefits and limitations of volitional passage, trap and haul, and dam removal approaches to the restoration of anadromous fish runs to habitat upstream of Iron Gate dam. The study program would provide an improved understanding of likely migration survival rates over the literature-based estimates that were used in the fish passage modeling conducted by Oosterhout (2005).

A-119 Comment: PacifiCorp (pp. 3-50 and 3-51), commenting on page 3-291, lines 10-18, of the draft EIS, states that, although dam removal would eliminate any passage mortalities associated with the facility, the risks of water quality and biological impacts are enormous, in light of its conclusion that reintroduction can proceed without dam removal. PacifiCorp (pp. 3-50, 3-51, 5-9 and 5-10) states that we fail to acknowledge in our analysis or in our summary of anadromous fish restoration measures in section 5.2.6, the contribution of Iron Gate Hatchery to the recreational, tribal, and ocean fishery, and the impact that would result from closure of the hatchery following dam removal, or reduction in hatchery production as anadromous fish are reintroduced to project reaches. PacifiCorp (p. 3-55) states that we should also discuss these potential effects in our cumulative effects analysis (section 3.3.3.3). Laura Smith (p. 2) states that our two-dam removal alternative in the draft EIS fails to detail a transition plan for the Iron Gate Hatchery, which would need to remain in place while fish recolonize upstream.

Response: Removal of Iron Gate dam would eliminate the water supply to Iron Gate Hatchery; closure of the hatchery before upstream runs have started to rebuild would have substantial adverse effects on commercial, recreational, and tribal fisheries, especially for fall Chinook salmon. We revised our evaluation of two- and four-dam removal scenarios to defer the removal of Iron Gate dam for 5 years after upstream dams are removed. We also assume that adult anadromous fish would be trucked around Iron Gate dam to initiate colonization of upstream habitat during this period, which should reduce the magnitude and extent of fisheries restrictions that would be required when production ceases at Iron Gate

Hatchery. Downstream passage of outmigrating smolts during this interim period could be accomplished via seasonal spills.

Anadromous Fish Restoration

A-120 Comment: Interior (p. 72) and NMFS (p. 52) comment that the draft EIS, on page 3-263, line 30, refers to releasing transported smolts as close to the estuary as possible, yet no specifics are provided. No assumption regarding a release point or costs to transport to the estuary release point are clear in the cost estimate, nor are any specifics regarding annual operation and maintenance costs provided in appendix A of the draft EIS. The EIS needs to be revised to include this information.

Response: We modified the cited text to state that releasing transported smolts 20 or more miles downstream of Iron Gate dam could reduce their exposure to pathogens, which appear to be especially prevalent in the first 10 or 20 miles downstream of Iron Gate dam. We include evaluation of the potential survival benefit of alternative release locations as part of an integrated fish passage and disease management program, which we discuss in detail in section 3.3.3.2.5, *Anadromous Fish Restoration*, of this EIS. The plan would include the release of marked hatchery smolts at multiple locations downstream of Iron Gate dam to evaluate any effects of release location on *C shasta* infection rates on fish recovered at the FWS screw trap sampling site at Big Bar (RM 49.7). Information gained from these releases would be one component of an evaluation of the effectiveness of alternative downstream passage alternatives, which may include multiple fish screening facilities, collection and transport, spillway passage, or a combination approach.

A-121 Comment: Interior (p. 72) and NMFS (p. 52) note that tables 3-68 through 3-70 of the draft EIS show that thermal stress levels for Chinook salmon and steelhead, based on temperature and DO, are nearly identical at Walker Bridge and Keno dam. Despite these stress levels, Chinook salmon and steelhead continue to persist, if not thrive, most of the year in the vicinity of Walker Bridge. Under these similar conditions, it is reasonable to conclude that Chinook salmon and steelhead would be able to use habitat near Keno dam most of the year as well.

Response: Although the cited tables do indicate that thermal stress in the Keno and Walker Bridge sites are similar, we note that stress levels degrade to severely stressful conditions about 2 weeks earlier in the Keno reach. We also note that, with the exception of thermal refugia in the J.C. Boyle bypassed reach and at the mouths of coolwater tributaries, thermal conditions in the late spring and summer are marginal for supporting anadromous salmonids in virtually the entire Klamath River downstream of Upper Klamath Lake. Downstream of Iron Gate dam, NAS (2004) reports that juvenile salmonids crowd into thermal refugia at the confluence with cool-water tributaries during the summer months, and that competition for space in these refugia appears to preclude use of the mainstem river by coho salmon during the summer months. Given the marginal thermal conditions in the project area, we remain convinced that the ability of migrating smolts to survive the added stress of passage through project reservoirs and multiple screening facilities is a critical uncertainty that must be addressed before the optimal approach for providing downstream passage can be determined.

A-122 Comment: Interior (p. 12), NMFS (p. 20), and Oregon Fish & Wildlife (p. 78) comment that they agree with much of the analysis of project effects on water quality in pages 3-132 through 3-134, and 3-146 through 3-149 of the draft EIS. However, they state that our analysis does not assess the impacts of water quality on fish or wildlife beyond mentioning that near-complete anoxia during certain time periods and fish kills are sometimes observed in and downstream of Keno reservoir (page 3-166, lines 16-20). The draft EIS states that exposure to adverse water quality conditions during passage through project reservoirs is a strong basis for questioning whether volitional passage at the reservoirs should be implemented (draft EIS, page 3-294, line 23). As described in the draft EIS, in the warmer summers,

water quality conditions can become warm and oxygen levels can be too low for fish in some areas, especially at Keno reservoir. However, they state that the comprehensive water quality management plan required in measure 4P should be viewed as an expenditure with real benefits to water quality in the project reaches, and that adverse conditions would be at least partially reversed by implementation of a comprehensive water quality management plan.

Response: In the draft EIS, we discuss the adverse effects of water quality conditions on aquatic species within and downstream of the project in sections 3.3.3.1.1, *Aquatic Habitat Conditions*, 3.3.3.1.4, *Diseases Affecting Salmon and Steelhead*, and 3.3.3.2.5, *Anadromous Fish Restoration*. In this EIS, we modified the Staff Alternative to include a fish passage and disease management program, which includes a series of studies that are designed to determine the extent of project effects on water quality and conduct expeditious experiments to assess methods for addressing adverse effects on water quality. We also acknowledge that habitat restoration and water quality enhancement efforts in the basin, including measures that would be implemented in the new license, may improve habitat conditions in the future. Further, we also note that the potential for future improvements in habitat and water quality conditions must be taken into account when the potential benefits of measures such as implementing fish passage are considered. As we note in our response to the previous comment; however, thermal conditions in the late spring and summer are marginal for supporting anadromous salmonids in virtually the entire Klamath River downstream of Upper Klamath Lake, and water temperatures may become even more adverse in the future, given current trends in water temperatures in the basin.

A-123 Comment: Interior (p. 74), NMFS (p. 53), and Cal Fish & Game (p. 30) comment that page 3-272, line 11, of the draft EIS, refers to upstream passage at J.C. Boyle providing access to 4.7 miles of mainstem and 15 miles of Spencer Creek habitat. Given that ladders at Keno and Link River would pass anadromous fish, adequate upstream passage at J.C. Boyle for anadromous fish would also create access to the 350 miles of historical and currently viable habitat above Keno dam. The draft EIS acknowledges that restoration of anadromous fish passage to areas upstream of the project has the potential to increase anadromous fish populations by restoring access to more than 350 miles of habitat that was historically used by Chinook salmon, and possibly by other anadromous species including steelhead (page 5-36 and others). However, the draft EIS analysis arbitrarily limits the estimate of miles of fish habitat gained from passage to the project boundaries and notes that provision of passage over Iron Gate, Copco No. 1, and J.C. Boyle dams would provide access to approximately 3.4, 25.6, and 19.4 miles of riverine habitat, respectively (and that this habitat could support about 1,200, 4,600, and 4,200 adult fall Chinook salmon spawners, respectively). This analysis distorts and underestimates the gains associated with passage. These are real benefits, in spite of the fact that they may be outside the project boundary. The EIS needs to be revised to accurately account for the miles of habitat that project fishways would create access to above J.C. Boyle dam and include the benefits of access to this habitat in the analyses of the alternatives.

Response: We modified the text in section 3.3.3.2.2, *Fish Passage*, to acknowledge that if anadromous fish should be successfully passed upstream of J.C. Boyle dam, they could potentially have access to more than 350 miles of potential habitat upstream of Upper Klamath Lake. However, we point out that there are critical uncertainties associated with whether anadromous fish could successfully pass upstream and downstream of Keno reservoir and Upper Klamath Lake. Whether such uncertainties actually represent substantive barriers to anadromous fish restoration is currently unclear, but if so, the barriers would need to be overcome before the actual benefits of gaining access to habitat upstream of Upper Klamath Lake would accrue.

A-124 Comment: Interior (p. 17), NMFS (p. 36), and Cal Fish & Game (p. 25) state that any trap and haul alternative needs to identify how anadromous steelhead and lamprey would be distinguished from resident stocks. Cal Fish & Game is not aware of how outmigrating early life stages of steelhead and lamprey could be identified, which they view as a critical flaw in our recommended trap and haul

program, since it would result in mortality or displacement of resident species. The Klamath Tribes (p. 15) raise similar concerns about distinguishing outmigrating steelhead from resident trout in a trap and haul program, and state that downstream volitional fish passage is the only viable alternative short of dam removal. Cal Fish & Game states that expanding a trap and haul effort to accommodate multiple species with multiple life histories over an extended period of time is an infeasible task, destined for failure. American Whitewater (pp. 8-10) is opposed to trap and haul as an anadromous fish restoration strategy for similar reasons as specified by the agencies, and supports volitional fish passage at any dams that are not removed. The Hoopa Valley Tribe (p. 17) comments that there is no evidence that methods of passage such as trap and haul are effective for all affected target species, whereas volitional passage would be effective for the full range of target species affected by the project, including Pacific lamprey. Cal Fish & Game (pp. 25-27) also comments that, unless trap and haul is performed at each project dam without fish ladders, historic habitat that is suitable for anadromous fish would be bypassed, and connectivity between reaches for anadromous salmonids and rainbow trout would not be provided. The Hoopa Valley Tribe (pp. 16 and 17) states that volitional passage is the only alternative, other than dam removal, that would provide access to critical habitats, and connectivity between these habitats. Rogue Flyfishers (p. 4) state that any trap and haul alternative is not scientifically supportable, is not nearly as effective or protective of all affected species as dam removal and volitional passage, and would just delay taking needed action to restore Klamath River salmon, steelhead, rainbow trout, and lampreys. Terry Bendock (p. 1), Patricia Selby (p. 1), and Lawrence Bressler (p. 1) consider trapping and hauling fish around project dams to be an ineffective solution to restoring anadromous fish. John Vogler (p. 1) and Dale Condon (p. 1) state that fish ladders should be installed at any project dam that prevents anadromous fish passage and Mr. Condon adds that if fish ladders are not installed, the dams should be removed.

Response: Any resident trout and lampreys that are transported downstream via a trap and haul passage, volitional, or combination approach could return to their reach of origin using the same facilities that would provide upstream passage for anadromous fish, as long as these facilities are designed to accommodate smaller resident fish. We acknowledge that a trap and haul approach may bypass one or more interdam reaches, and would not provide full connectivity to those reaches. However, if studies conducted under the integrated fish passage and disease management program described in this EIS indicate that a trap and haul approach is the most beneficial approach for providing passage for anadromous fish; this is a tradeoff that would need to be considered. Given the very substantial value of anadromous fish runs to commercial, recreational, and tribal fisheries, benefits to those species would likely carry a greater weight than resident fish species in the approach that is ultimately selected and implemented.

A-125 Comment: Interior (p. 18) and NMFS (p. 37) state that the EDT fish passage modeling by PacifiCorp has no sensitivity analysis or calibration, and has not been validated; therefore, the model results cannot be reliably evaluated. The draft EIS conclusions regarding the merits of trap and haul scenario have no basis when applied to other anadromous runs and species in the Klamath River. The appropriate KlamRAS/EDT modeling is valid only for fall run Chinook salmon. Cal Fish & Game (pp. 27-28) points out that, except for the 1F trap and haul alternative, volitional fish passage alternatives rank higher than trap and haul options. Cal Fish & Game considers the results of alternative 1F to be anomalous because it assumes a downstream collection efficiency of 90 to 100 percent, which would be technologically infeasible. Consequently, Cal Fish & Game does not agree with our conclusion in the draft EIS that modeling demonstrated that volitional fish passage has lower returns compared to a trap and haul alternative.

Response: The EDT and KlamRAS modeling results depend on key assumptions regarding passage survival that need to be verified before these results can be used to accurately estimate the benefits that trap and haul and volitional approaches would provide. We conclude that this is true for all anadromous species, including fall Chinook salmon. However, we present the available modeling results for all

species as the best currently available information on alternative restoration approaches. As noted above, we incorporate study elements in the integrated fish passage and disease management program described in this EIS to address key critical uncertainties. The plan includes provisions for assessing the immediate and delayed survival of adult and juvenile fish transported over different distances and released at different locations in the river, and comparison of these with the survival rates of radio-tagged fish migrating through the project reservoirs.

A-126 Comment: PacifiCorp (pp. 5-7 and 5-8), commenting on page 5-36, lines 32-35, of the draft EIS, states that it seems illogical to construct a volitional fish passage system, as the agencies recommend, that exposes anadromous fish production from the 350 miles of stream upstream of Keno dam to the mortality associated with passage through multiple dams and reservoirs so that anadromous fish can access an additional 58 miles of habitat between Keno and Iron Gate dams.

Response: We conclude that better information on comparative survival rates of fish transported via trap and haul versus volitional passage is needed to determine the relative benefits of each approach for providing access to habitat within and upstream of the project. Our staff-recommended integrated fish passage and disease management program would provide this information.

A-127 Comment: Cal Fish & Game (p. 26 and 27) states that with volitional fish passage, fish would likely migrate during the cooler time of day or night, thus avoiding periods when the water temperature exceeds thresholds for fish handling. Such behavioral adaptations to poor water quality are not possible with trap and haul programs, and the extra stress of handling the fish would potentially result in an unacceptable level of mortality.

Response: We concur that this is one potential advantage of volitional passage, but this benefit could be outweighed by losses associated with predation in project reservoirs or cumulative injuries and stress from passage through multiple reservoirs and screening facilities. Any advantage or disadvantage associated with these factors would be reflected in the survival rates observed during telemetry studies that would be conducted as part of the integrated fish passage and disease management program described in this EIS. The results from these studies would assist with the selection of the most appropriate approach for providing fish passage at each development.

A-128 Comment: Cal Fish & Game (p. 26) comments that the amount of time returning adult salmon and steelhead tolerate delay is limited. Limitations on holding fish in the transport truck could preclude transport of adults collected at Iron Gate dam from being transported upstream of J.C. Boyle dam.

Response: Immediate and delayed mortality of adult anadromous fish transported via trap and haul would be evaluated via telemetry studies as part of the integrated fish passage and disease management program described in this EIS. Comparing the survival rates of different release groups that are held for different time periods prior to transport and that are transported for different distances would allow the effects of delay and transport conditions to be evaluated.

A-129 Comment: Interior (p. 18) states that anadromous fish restoration approaches should consider the habitat needs of Pacific lamprey. Although their historical distribution above the project is unknown, suitable habitat for spawning and juvenile rearing is available within tributaries and stream reaches in the project area, and trap and haul would deny Pacific lamprey the use of this habitat in the project area.

Response: In section 3.3.3.2.5, *Anadromous Fish Restoration* of this EIS, we review information related to lamprey passage that was filed in the EPAct 2005 proceeding on disputed issues pertaining to preliminary mandatory conditions. Our review of the ALJ's decision and its supporting documentation did not reveal any information suggesting that juvenile lamprey could effectively migrate through

standing bodies of water as large as Copco and Iron Gate reservoirs. Lamprey are a weak-swimming species, which may make them especially vulnerable to predation when migrating through a reservoir environment. Our review also supports our understanding that the development of screening criteria for this species is in the early stages of development. In addition, testimony stating that lampreys tend to suffer low rates of mortality during turbine passage is not relevant in evaluating the benefits of volitional passage as proposed, because screens constructed to meet NMFS criteria would screen the entire flow that enters each powerhouse, and would preclude turbine passage. Consequently, construction of upstream and downstream volitional fishways at project dams would result in similar uncertainties as a trap and haul program. Specifically, the uncertainties regard providing successful use of habitat that may exist upstream of project dams by Pacific lamprey, if they should reach the base of Iron Gate dam.

A-130 Comment: PacifiCorp (p. 3-51), commenting on page 3-291, lines 10-18, of the draft EIS, states that the advantages that dam removal would have for restoring Pacific lamprey to habitat upstream of Iron Gate dam are uncertain because the ALJ concluded that whether this species ever occurred upstream of Iron Gate is inconclusive. PacifiCorp states that lampreys collected upstream of Iron Gate previously identified as Pacific lamprey were likely misidentified.

Response: We modified this EIS to indicate that we are not aware of any conclusive evidence that Pacific lamprey historically occupied habitat upstream of Iron Gate dam. However, we also note that Hamilton et al. (2005) concludes that Pacific lamprey likely migrated as far upstream as Spencer Creek, based on the extent of Pacific lamprey migrations in other coastal rivers, their general congruence with anadromous salmonid distributions, the historical absence of lamprey passage barriers in the mainstem Klamath River, and the homogeneity of the lower Klamath River fish fauna throughout the mainstem Klamath upstream to Spencer Creek.

A-131 Comment: Interior (p. 18) states that anadromous fish restoration approaches should consider the habitat needs of spring-run Chinook salmon. Coolwater refugial areas in the project reach are potentially of great value to restoring these runs. The largest coolwater refugium in the Klamath River is the 220 cfs spring below J.C. Boyle dam. This habitat would be bypassed by trap and haul, thus potentially denying it to spring-run Chinook salmon, during a critical period of its life cycle.

Response: Access to coolwater refugia would be critical to any attempt to reintroduce spring run Chinook salmon to habitat upstream of Iron Gate dam, and the coolwater refugium in the J.C. Boyle bypassed reach would provide an ideal holding area for adult spring Chinook salmon. The integrated fish passage and disease management program that we describe in this EIS would include both the immediate reintroduction of anadromous fish species to project reaches upstream of Copco 1 reservoir and studies to determine the most beneficial approach to restoring anadromous fish to project reaches and habitat upstream of the project.

A-132 Comment: Interior (p. 20), NMFS (pp. 37 and 38), and Cal Fish & Game (p. 30) state that anadromous fish restoration approaches should consider the habitat needs of federally listed coho salmon. They suggest that our analysis should consider that habitat in the project reach would be of benefit by (a) extending the range and distribution of the species thereby increasing the coho salmon's reproductive potential; (b) increasing genetic diversity in the coho stocks; (c) reducing the species vulnerability to the impacts of habitat degradation; and (d) increasing the abundance. The Hoopa Valley Tribe (pp. 38-42) and Klamath Tribes (p. 7) comment that the draft EIS improperly discounts the benefits of providing threatened coho salmon with access to habitat upstream of Iron Gate dam, citing the ALJ's conclusion that water temperature, predation, and passage mortality would not preclude coho salmon from successfully using and benefiting from habitat within the project to support its statement.

Response: Our revised Staff Alternative provides for the immediate reintroduction of coho salmon to Spencer Creek, which appears to provide the greatest potential habitat for reintroduction of this species. The integrated fish passage and disease management program includes installation of a fish screen meeting NMFS criteria at J.C. Boyle dam in the first year after license issuance. This screen could initially be used to collect coho salmon smolts and enable the effectiveness of trap and haul transport from J.C. Boyle dam to below Iron Gate dam, and subsequent survival during passage through the lower Klamath River using radio telemetry. Telemetry studies assessing immediate and delayed mortality of adult and juvenile anadromous fish transported by truck or migrating volitionally through project reservoirs, and of survival rates of smolts passing over project spillways, would help to guide decisions on the most appropriate and beneficial methods for providing passage through the project. Depending on the approach that is selected for implementation, this could provide access to other tributaries within the project that may support coho salmon. We focus initial restoration efforts on Spencer Creek, which contains 14.7 miles of good quality habitat suitable for coho salmon. Although NAS (2004) concluded that the smaller tributaries to Copco and Iron Gate reservoirs also contain potential habitat, some of these streams (especially Jenny Creek) have been degraded by irrigation diversions, and the lower portions of these streams were inundated when Copco and Iron Gate reservoirs were created. Impassable waterfalls further limit the upstream extent of passage on both Fall and Jenny creeks, and low summer flows limit the suitability of habitat conditions on some of the other small tributaries.

A-133 Comment: Interior (p. 20), NMFS (p. 36), and Cal Fish & Game (p. 27) state that the EIS needs to consider recent comparisons of trap and haul to in-river migration on the Columbia River, where Chinook salmon that outmigrate in-river have better survival to adulthood than fish that are transported.

Response: We are aware that this is an area of ongoing study in the Columbia River Basin, and that delayed, as well as immediate mortality, needs to be considered when comparing volitional passage and transport options. We include provisions to evaluate both immediate and delayed mortality effects as part of the integrated fish passage and disease management program in the Staff Alternative described in this EIS. Radio telemetry techniques would be used to evaluate the immediate and delayed mortality of smolts transported for different distances, and would be compared to the immediate and delayed mortality of smolts passed volitionally via project spillways. Establishing several monitoring points at bridge crossings over the length of the lower Klamath River should provide good information on the immediate or delayed mortality of fish that are subject to stress or injury during transportation or in-river passage.

A-134 Comment: PacifiCorp (p. 5-7) agrees with our statement on page 5-36, lines 32-35, of the draft EIS, that a trap and haul program would avoid juvenile mortality due to predation and poor water quality and the cumulative effects on anadromous migrants that would be sustained by fish passing multiple screening facilities. PacifiCorp points out that data collected by FPC (2005) on the Columbia River indicates that smolt-to-adult survival rates for wild spring Chinook salmon and steelhead are about 25 to 35 percent lower for fish that encounter one or more bypass systems compared to fish that migrate through spillways and turbines. PacifiCorp uses this information to support its position that an adaptive management approach that allows for testing of facility impacts on juvenile and adult fish would likely be more effective from a biological and cost perspective. PacifiCorp (p. 5-8) states that such an adaptive program should be conducted over a timeframe sufficient to cover the full range of environmental conditions expected and with sufficient statistical rigor to support management actions.

Response: The potential for providing passage via project spillways should be considered as part of an adaptive approach to anadromous fish restoration. We incorporate these elements into the integrated fish passage and disease management program that we include in the Staff Alternative of this EIS. The plan includes assessment of spillway passage survival, the volume of spill that would be needed to attract outmigrating smolts to project spillways, and the mortality rate of any smolts that pass via the project's turbines.

A-135 Comment: On page 5-37, lines 32-34, of the draft EIS, we state: "We estimate the annualized cost of the radio telemetry and juvenile production monitoring, evaluation of fish passage options, and development and implementation of an anadromous fish restoration plan would be $107,530, $10,110, and $24,220, respectively." PacifiCorp believes that the estimated costs that we present are too low if statistically valid estimates of juvenile and adult production and survival are to be achieved for the three species of interest. PacifiCorp's estimated costs to complete the five studies that it considers necessary are as follows (2006$): (1) juvenile survival studies in reservoir, $570,900; (2) juvenile production, $667,600; (3) adult behavior and survival, $201,900; (4) fish passage options, $36,000; and (5) anadromous fish reintroduction, $58,800. The total would be $1,535,200. PacifiCorp notes that development of anadromous fish passage and reintroduction study plans would require a substantial number of meetings with agencies, which would increase study costs.

Response: The costs that we present in section 5 of the draft EIS are annualized costs (annual costs distributed evenly over 30 years, using escalation rates to account for the cost of capital). For example, although the total annualized cost of the three study components PacifiCorp cites is $141,860, the total expenditure would be $1,050,930. We modified our adaptive approach to anadromous fish restoration in this EIS and our estimated costs for this modified approach are included in table A-1.

A-136 Comment: Commenting on our discussion of the benefits of establishing a fisheries technical committee to oversee implementation of project-related measures pertaining to anadromous fish restoration on page 3-297, lines 23-28, of the draft EIS, PacifiCorp (p. 3-53) states that it proposes to fund the administrative costs of a fisheries technical committee that would oversee the technical framework of its adaptive anadromous fish reintroduction plan described in its alternative fishway prescriptions.

Response: We modified the text in section 3.3.3.2.5, *Anadromous Fish Restoration*, to describe this component of PacifiCorp's December 1, 2006, alternative fishway prescription.

A-137 Comment: Cal Fish & Game (p. 27) states that a trap and haul program could potentially result in increased competition with hatchery fish and resultant increased juvenile mortality in the lower Klamath River, unless the timing of the trap and haul operation was carefully coordinated to avoid large hatchery releases.

Response: We agree, but there is no reason that the timing of smolt releases from the hatchery could not be coordinated to minimize potential adverse effects on transported fish.

A-138 Comment: Interior (pp. 20 and 21) and NMFS (p. 36, 37, 40, and 41) state that the EIS needs to consider the full suite of biological and economic benefits to providing access to project area habitats for all anadromous species that historically had access to the Klamath River upstream of Iron Gate dam, taking into account their various life history strategies that would be used to re-colonize the area once passage is provided. Interior states the draft EIS modeling conclusions are flawed because they are based on an inappropriate analysis (the EDT fish passage modeling) for the following reasons: (1) the conclusion overlooks recent findings about returns from trap and haul relative to in-river migration of outmigrants, (2) the conclusions regarding the merits of trap and haul scenario for fall run Chinook salmon have no basis when applied to other anadromous runs and species in the Klamath River, and (3) the conclusions have not considered factors other than adult returns that are critically important for other species and runs.

Response: Again, we conclude that there are critical uncertainties that need to be addressed to determine the most effective approach for maintaining existing anadromous fish runs downstream of the project and for restoring anadromous fish to habitats within and upstream of the project. The Staff Alternative described in this EIS includes measures that would immediately restore passage to key habitat within and

upstream of the project and gather information to address these uncertainties. We agree that the existing EDT and KlamRAS modeling is not sufficient to determine the most effective approach for restoring anadromous fish to habitat within and upstream of the project, especially given uncertainties regarding survival rates through project reservoirs and future trends in the disease-related mortality of Chinook and coho salmon smolts outmigrating through the lower Klamath River.

A-139 Comment: PacifiCorp (pp. 3-52 and 3-53) states that the following changes should be made to table 3-72 in the draft EIS, which compares benefits of three alternative approaches to anadromous fish restoration: (1) the reduction of disease risk attributed to dam removal should be deleted; (2) a thoughtful science-based, adaptive approach to ensure success with any reintroduction effort should be added to the benefits of PacifiCorp's alternative prescription; (3) the risks associated with disease transmission should be removed from all three alternatives in the table, since the ALJ concluded that this risk is minimal; and (4) decreased harvest levels should be added as a risk to the dam removal alternative, since the Iron Gate Hatchery enables higher harvest levels and would no longer operate with dam removal.

Response: We maintain that dam removal is likely to reduce the incidence of fish disease downstream of the project, but we added a footnote to the table stating that we include elements in the integrated fish passage and disease management program described in this EIS that would help to determine and address project-related effects on fish diseases downstream of Iron Gate dam. We concur that an adaptive management approach to addressing fish passage is appropriate and this is embodied in our integrated fish passage and disease management program. We consider our plan to be more comprehensive than the approach described in PacifiCorp's alternative fishway prescription, which does not address alternative approaches to restore anadromous fish to habitats within the project area. We do not concur that restoration of fish passage does not carry some risk of transmitting fish diseases to upstream populations of resident fish, and given the reported quality of the rainbow trout fishery in tributaries to Upper Klamath Lake, we think this risk merits its inclusion in the table. Finally, we added text noting the risk that fisheries for fall Chinook salmon may need to be curtailed if Iron Gate dam is removed because it would result in loss of the hatchery water supply.

A-140 Comment: Interior (p. 76) and NMFS (p. 61) state that table 3-76 of the draft EIS does not include an analysis of adult fall Chinook salmon or any other species that could be accommodated by spawning habitat above the Keno reach. The EIS needs to adequately analyze the benefits of volitional fishways for all species in and above the project reach.

Response: We added text to section 3.3.3.2.5, *Anadromous Fish Restoration*, that addresses the potential for increased production of other anadromous fish species due to the restoration of passage to habitat within and upstream of the project.

A-141 Comment: PacifiCorp (pp. 3-55, 5-9, and 5-10) states that our cumulative effects discussion in section 3.3.3.3 and the benefits that we ascribe to anadromous fish reintroduction in section 5.2.6 should account for harvest management changes. It states that such changes may be required to protect anadromous fish populations originating in stream reaches within and upstream of Keno dam following reintroduction until a sustainable fishery is achieved, which would take years. PacifiCorp notes that our discussion in section 5.2.6 does not discuss this likely restriction on future harvest rates if anadromous fish are reintroduced upstream of Iron Gate dam. PacifiCorp comments that for reintroduction to be successful, harvest rates on upper basin fish populations would need to be kept low, or the fish differentially marked. Marking could be accomplished in a trap and haul system, but would defeat the purpose of a volitional fish passage system (i.e., reduced fish handling).

Response: We modified sections 3.3.3.3 and 5.2.6 to reflect the possibility that harvest restrictions could be deemed necessary to ensure the success of anadromous fish restorations upstream of Iron Gate dam.

A-142 Comment: PacifiCorp (pp. 3-53 and 5-16) states that we should make clear whether table 3-76 represents the estimated number of fall Chinook salmon produced in each reach or the amount of spawning habitat present. PacifiCorp comments that we give the impression we are presenting the number of adults that would be produced in each reach, which is not the case. PacifiCorp states that table 3-76 represents spawning area capacity, not estimates of resulting production.

Response: We modified the title of the table to indicate that the numbers of adult salmon presented represent the potential habitat capacity of each reach, and added a footnote stating that the capacity estimates are based on past returns, and that future adult returns would depend on multiple factors including current habitat conditions, passage survival, disease effects, harvest management, and ocean conditions.

A-143 Comment: PacifiCorp (pp. 3-53 and 3-54) states that we overestimate the number of adult spawning Chinook salmon that could be accommodated in Jenny Creek in table 3-76 because much of the best historical spawning habitat has been inundated by Iron Gate reservoir, and the observations made by Coots and Wales (1952) likely consisted largely of spawning Chinook salmon of hatchery origin.

Response: We added a footnote to the table indicating that the habitat capacity in Jenny and Fall creeks has likely been reduced due to partial inundation by Iron Gate reservoir. Although some of the fish observed by Coots were likely hatchery returns, adult returns in any location and year can be influenced by many factors including straying of hatchery fish, harvest, passage survival, and ocean conditions.

A-144 Comment: PacifiCorp (pp. 3-38, 3-39, and 5-15), commenting on page 3-278, lines 4-10, and section 5.2.21, *Dam Removal*, of the draft EIS, where we discuss potential anadromous fish spawning habitat that would become available if upstream fish passage is provided at Iron Gate dam (including dam removal), states that Coots and Wales (1952) observations referenced on page 3-278 represent a visual estimate by the authors of their opinion of how many fish could spawn in the Copco No. 2 bypassed reach, and should not be construed as the natural production potential in this reach. PacifiCorp points out that large numbers of hatchery salmon were still being released in the Klamath River during the 1940s and 1950s, and there is a high probability that the fish observed by Coots and Wales were hatchery fish. PacifiCorp concludes that this 1.4-mile-long, bedrock-dominated reach has little if any suitable Chinook salmon spawning habitat.

Response: Although the Copco No. 2 bypassed reach may currently provide little Chinook salmon spawning habitat, it is likely that there was more gravel in the reach when Coots and Wales made their observations more than 50 years ago, and we expect that gravel augmentation would be implemented in this reach if anadromous fish are restored to the reach. We have no reason to discount their observation that "a large portion of the available spawning areas appeared unused."

A-145 Comment: PacifiCorp (p. 5-9) comments: "Please note that in Table 3-76 on page 3-298, it appears the number should be 5,800 fish (rounding up), not 4,600 as listed."

Response: The number 4,600 does not appear in the indicated table in the draft EIS. PacifiCorp appears to be referring to section 5.2.6 of the draft EIS where we state that we estimate that provision of passage over Iron Gate, Copco No. 1 and J.C. Boyle dams would provide access to approximately 3.4, 25.6, and 19.4 miles of riverine habitat, respectively, and that this habitat could support about 1,200, 4,600, and 4,200 adult fall Chinook spawners, respectively. We modified the text to reflect the numbers shown in table 3-76, which indicate that the habitat could support about 1,200, 5,800, and 4,200 fish based on the values presented in table 3-76 (rounding up to the nearest 100 fish).

A-146 Comment: On page 5-37, lines 39 and 40, of the draft EIS, we estimate that restoring anadromous fish passage at Iron Gate, Copco No. 1, and J.C. Boyle dams would support 1,200, 4,600, and 4,200 adult fall Chinook salmon spawners, respectively. PacifiCorp (pp. 5-8 and 5-9) considers our estimates to be optimistic, because mainstem habitat is likely to support 145 fish per mile based on spawner surveys downstream of Iron Gate dam, rather than the 245 fish per mile that we estimated. Interior (pp. 72 and 76) and NMFS (pp. 60-61) indicate that our concern regarding disease risks associated with anadromous fish reintroduction, referenced on pages 3-263, line 32, and table 3-72 of the draft EIS, is unfounded. They state that the concern regarding potential introduction of the IHN virus has been addressed by the ALJ's findings: the existence of the virus IHN in the Klamath River system is exceedingly rare and because the majority of pathogens currently found in the lower basin also exist in the upper basin of the Klamath River system, a logical conclusion is that migration of anadromous fish would not be a significant factor contributing to disease of resident fish. The EIS needs to be revised to reflect these findings and adequately analyze the benefits of volitional fishways.

Response: Although the ALJ found it was logical to conclude the migration of anadromous fish would not be a significant factor contributing to disease of resident fish, we maintain there is some level of risk of disease transmission associated with providing fish stocks that are currently restricted in the lower watershed with access into the upper watershed. However, we do not consider this risk a basis for foregoing appropriate anadromous fish restoration upstream of Iron Gate dam. PacifiCorp estimates that fall Chinook salmon production from the project area under the volitional fish passage alternative would be about 1,600 adult fish using EDT modeling results supplied by PacifiCorp in response to AR-2, which is considerably less than the roughly 10,000 adult fish that we predict.

We see no reason to assume that habitat downstream of Iron Gate dam is seeded to its capacity. Given the high productivity of the Klamath River, there is no evidence to suggest that the habitat could not support more adult spawners than it has in recent years if problems with water quality and disease are reduced. Addressing these factors is a key objective of the integrated fish passage and disease management program that we include in the Staff Alternative of this EIS.

A-147 Comment: PacifiCorp (p. 3-54) states that our estimate of fall Chinook salmon in Spencer Creek assumes that habitat conditions are identical throughout the Klamath River Basin, which is not the case. Much of Spencer Creek passes through meadows that would not support spawning. PacifiCorp notes that our estimate of 4,175 adult fish that could use Spencer Creek for spawning exceeds the average abundance (3,625) of fall Chinook salmon observed in the 190 miles of mainstem habitat below Iron Gate dam, which PacifiCorp concludes is not realistic.

Response: As we note in the draft EIS, the mainstem of the Klamath River supports a relatively small proportion of the fall Chinook salmon that spawn in the basin. Substantial returns of adult fall Chinook salmon to other tributaries in the lower basin, shown in table 3-47 of the draft EIS, support our conclusion that our estimate for Spencer Creek is not unreasonable. The escapement of adult fall Chinook salmon to the Shasta River has averaged 5,768 fish, despite greatly reduced flows due to agricultural diversions and highly degraded water quality. Although the average number of adult fall Chinook salmon that return to Bogus Creek is even higher (9,474 fish), returns to this tributary likely include many strays from Iron Gate Hatchery, which is located a short distance upstream from Bogus Creek.

A-148 Comment: On page 5-57, lines 10-12, of the draft EIS, we state: "We estimated that about 12,000 spawners could potentially be accommodated if both Iron Gate and Copco No. 1 dams were removed and fish passage was provided at Copco No. 2 dam." PacifiCorp (p. 5-15 to 5-17) states that it is unclear how we developed the 12,000 spawner estimate. The data presented in table 3-76 of the draft EIS indicates that with the dams and reservoirs in place, the Iron Gate to Keno reach would support 11,097 fall Chinook salmon spawners. PacifiCorp indicates that potential spawning habitat in Iron Gate and

Copco reservoirs would increase the number of spawners that could be supported from Iron Gate to Keno to 15,805, using the assumptions that we present in table 3-76. PacifiCorp states that if this revised estimate is correct, the value should be incorporated into the EIS.

Response: We modified the text to indicate that about 11,000 fall Chinook salmon spawners could be accommodated in existing habitat between Iron Gate and Keno dams and another 12,000 spawners could be accommodated in inundated habitat if both Iron Gate and Copco No. 1 dams were removed and effective fish passage was provided at Copco No. 2 and at J.C. Boyle dams. The basis for our estimate of habitat capacity for inundated habitat is provided in 3.3.3.2.4, *Dam Removal or Decommissioning*, and the basis for the capacity of existing habitat is provided in table 3-76 of the draft EIS.

A-149 Comment: Page 3-294, lines 23-26, of the draft EIS, states that "Given the potential for predation and exposure to adverse water quality conditions during passage through project reservoirs and screening facilities, we conclude there is a strong basis for questioning whether the provision of volitional passage at each project development would provide any advantage or benefit over the trap and truck approach described in PacifiCorp's alternative prescription." Interior (p. 76), NMFS (p. 60), the Water Board (p. 7), Cal Fish & Game (pp. 24 and 25), the Klamath Tribes (pp. 7 and 8), and the Hoopa Valley Tribe (p. 20) are not sure what evidence supports this assertion. The PacifiCorp study that evaluated predation risks to migrating juvenile Chinook salmon within the reservoir system is deemed lacking and inconclusive. Table 3-72 of the draft EIS presents information concerning the amount of increased habitat available and increases in disease risk, but it does not compare the quality of available habitat, and resulting production potential of the alternatives, including the No-action Alternative. Table 3-73 of the draft EIS compares estimated survival rates for volitional versus trap-and-truck scenarios through sections of the Upper Klamath River, but the table does not identify cumulative survival while fish are trapped and trucked, or the effect the operation has on fish behavior and migratory behavior. Furthermore, table 3-74 shows that the KlamRAS model actually estimates a greater abundance of adult fish under the volitional passage scenario, not the trap and truck scenario, directly contradicting the assertion in the draft EIS. The EIS analysis should disclose the benefits that would be achieved under each alternative. Interior (p. 96), NMFS (p. 62), Cal Fish & Game (p. 24), and Oregon Fish & Wildlife (p. 167) comment that PacifiCorp relies heavily on the Miller radio-telemetry study to support its position that predation of juvenile anadromous fish in reservoirs would be significant. Finally, these commenters state the draft EIS did not consider that the ALJ concluded that the Miller radio-telemetry study is not scientifically reliable, and that it should be accorded little, if any, weight.

Response: Our assessment of the potential for predation on smolts during passage through project reservoirs in the draft EIS does not rely on the results of the Miller radio-telemetry study, but is based on the abundance of predacious fish species in project reservoirs as indicated by the results of sampling conducted in the project reservoirs (tables 3-44 and 3-46 in the draft EIS). We modified our text in section 3.3.3.2.5, *Anadromous Fish Restoration*, to include additional information from the EPAct 2005 proceeding that was filed with the Commission after the draft EIS was issued. We maintain that there is a high potential for predation in Copco and Iron Gate reservoirs based on the high abundance of yellow perch and documentation provided in Foote (2002) that this species can feed heavily on migrating juvenile fall Chinook salmon in a low velocity (lake or reservoir) environment. Regarding survival rates predicted via KlamRAS modeling, these model results are based on survival rates from studies conducted in other river systems. We maintain that there is a considerable degree of uncertainty regarding the survival rates that would occur during passage through project reservoirs, and that the modeling conducted to date is not sufficient to determine the best approach for restoring passage to habitat within and upstream of the project. We describe an approach to address this uncertainty as part of the recommended integrated fish passage and disease management program, which we describe in detail in section 3.3.3.2.5 of this EIS. The plan includes an aggressive timeline for reintroduction of anadromous fish to habitat within and upstream of the project and for studies targeted at resolving critical uncertainties

to determine the benefits of alternative approaches for restoring passage of anadromous fish to habitat upstream of Iron Gate dam.

A-150 Comment: Interior (p. 17), NMFS (p. 36), and Cal Fish & Game (pp. 30, and 31) comment that the EIS needs to adequately consider alternatives that meet agency goals for volitional passage for all anadromous species. Any trap and haul alternative needs to analyze the mortality that takes place in the estuary and early during ocean residence for both outmigrant fish that are transported versus those that pass through dams, as well as handling stress, mortality, and straying. Any trap and haul alternative needs to identify how predation and stress on small pre-smolt salmon would be managed in the presence of larger outmigrant steelhead. The EIS needs to fully analyze trap and haul stress associated with exposure to multiple acute handling, stress due to capture, crowding, marking or tagging, loading, transport, and release of juvenile fish.

Response: We modified the Staff Alternative to include an integrated fish passage and disease management program, which is designed to proceed immediately with the introduction of anadromous fish to habitat upstream of Iron Gate dam, combined with an aggressive study program designed to address key critical uncertainties that must be addressed to identify the most beneficial approach to anadromous fish restoration. The plan includes provisions for assessing the immediate and delayed survival of adult and juvenile fish transported over different distances and released at different locations in the river, and comparison of these survival rates with volitional passage. The assessment of immediate survival would include evaluation of mortality, including predation-related mortality, during transportation. We describe this program in detail in section 3.3.3.2.5, *Anadromous Fish Restoration.*

A-151 Comment: NMFS (pp. 36, 60, and 62) and the Water Board (p. 7) state that the "critical uncertainties that may affect the feasibility of restoration" referred to in section 3.3.3.2.5 of the draft EIS, in particular those having to do with reservoir predation, water quality, disease risks to resident fish, and migration of both adults and juveniles through the project, have been addressed by the ALJ's conclusions. Interior (p. 16) and NMFS (pp. 34 and 37), Cal Fish & Game (p. 24), Oregon Fish & Wildlife (p. 81), and the Hoopa Valley Tribe (pp. 18-20) state the draft EIS does not adequately analyze substantial, relevant information in the ALJ's decision and the record from the EPAct 2005 proceeding that relates to the benefits of volitional fishways.

Response: We reviewed the ALJ's conclusions relative to the potential effects of predation and water quality conditions within and downstream of the project on anadromous fish restoration and identified three instances where our analyses lead to different conclusions than those of the ALJ (see section 3.3.3.2.5, *Anadromous Fish Restoration*). First, the ALJ concludes that juvenile fall Chinook salmon would outmigrate through project reservoirs before water temperatures and water quality conditions become problematic. Our analysis, which is based on 4 years of screw trap monitoring at Big Bar, indicates that most hatchery and naturally produced fall Chinook salmon smolts outmigrate in July and August (see figure 3-47 in the draft EIS), by which time water quality conditions have typically deteriorated to stressful levels.

Second, the ALJ concludes that predation is not likely to constitute a significant risk to juvenile salmonids migrating through project reservoirs. Our analysis reveals that, based on the composition of the fish population in the project reservoirs and evidence that yellow perch can be an important predator of Chinook salmon smolts in a lake or reservoir environment, there is potential that substantial rates of predation would occur during migration through Copco and Iron Gate reservoirs (see our response to comment A-124).

Third, the ALJ concludes that, because anadromous salmonids currently complete their life cycles through eight dams and reservoirs on the Columbia and Snake rivers, they should be able to migrate

through the five project reservoirs on the Klamath. Our analysis reveals: (1) all of the salmon and steelhead ESUs in the Snake River are subject to heavy rates of hatchery supplementation; (2) adult return rates to the Snake River are very low despite extensive measures that are undertaken each year to improve migration survival including extensive spill, smolt transportation, and predator control programs; (3) critical water quality parameters are considerably more adverse in the Klamath River; and (4) lower average water velocities in the Klamath reservoirs are likely to result in slower rates of migration and increased exposure to predation. These factors lead us to conclude that the continued existence of anadromous salmonid species in the Snake River does not provide convincing support for a conclusion that volitional passage would be an effective approach for restoring anadromous fish to habitat within and upstream of the Klamath Hydroelectric Project.

A-152 Comment: On page 5-37, lines 42-45, of the draft EIS, we state: "This increase in fish production would benefit commercial, recreational, and tribal fisheries, and these benefits could amount to tens of millions of dollars annually if the harvest restrictions that have been imposed to protect the escapement of naturally spawning fall Chinook salmon to the Klamath were relaxed or eliminated." PacifiCorp (p. 5-16) states that, in order to support such a statement, we should provide estimates of the number of fish by species produced for each of the alternatives so that the biological and economic benefits of each alternative can be determined. PacifiCorp suggests that the December 2005 EDT results provided in response to our AIR could be used as a starting point for this analysis (although steelhead production values are considered index values and should not be used for estimating abundance and the EDT model was not run for coho salmon). PacifiCorp also suggests that we review data presented in tables 3-46 and 3-47 of the draft EIS to assess whether our fish/mile estimates that we use for calculating fall Chinook salmon production still hold.

Response: We revised 3.3.3.2.5, *Anadromous Fish Restoration*, to include a detailed discussion of two critical uncertainties that must be addressed before a reasonable comparison can be made of adult returns that could be expected under alternative approaches for restoring anadromous fish runs to habitat within and upstream of the project. The first critical uncertainty is whether substantial losses of outmigrating salmon smolts would occur during passage through project reservoirs under the NMFS/Interior prescriptions and under PacifiCorp's December 1, 2006, alternative prescription, and whether these losses could be reduced using a trap-and-truck approach for downstream passage. The second critical uncertainty is whether substantial losses of outmigrating salmon smolts from infection with *C. shasta* would continue and perhaps escalate in the future, and whether measures can be implemented that would reduce these losses. The integrated fish passage and disease management program that we include in the revised Staff Alternative is designed to address these uncertainties and to implement appropriate anadromous fish restoration measures in a timely and expeditious manner.

A-153 Comment: Oregon Fish & Wildlife (pp. 15 and 16) states that the Commission staff's fish passage alternative is confusing and not well defined. The draft EIS defines the alternative on p. 2-48, 12S. However, in subsequent text, fishways drop out to become recommendations for trap and haul based on the "actions needed to restore anadromous fish to the most promising reach, as determined from the 3 years of monitoring and assessment" (draft EIS p. 5-37, lines 23-26). Commission staff appear to support trap and haul because they have only proposed restoration to one of the three reaches described in table 3-76 (draft EIS p. 3-298 to 299). Interior (pp. 20 and 22), NMFS (pp. 39, 41, and 65), the Water Board (p. 8), and Cal Fish & Game (p. 29) express similar concerns about uncertainties regarding the reach and species recommended for reintroduction. The Water Board asks that the EIS compare fish production potential of the preferred and other alternatives, including benefits and impacts on other species besides fall Chinook salmon, and disclose uncertainties associated with each alternative. Quartz Valley Indian Reservation (p. 41) states that section 5.2.6, *Anadromous Fish Restoration*, requires major revisions because we overestimate the benefits of trap and haul and underestimate the benefits of volitional fish passage, and do not address how restoration would be achieved for all native anadromous fish species.

Response: We modified section 3.3.3.2.5, *Anadromous Fish Restoration*, to clarify and to: (1) describe an integrated fish passage and disease management program that is designed to implement the immediate restoration of anadromous fish to habitat upstream of Iron Gate dam; (2) gather information needed to address the two critical uncertainties identified in the previous comment response relating to fish passage and project effects on fish disease; and (3) identify and implement appropriate restoration measures for all anadromous fish species that historically occurred in project waters in a timely manner. Other aspects of this approach are described in our responses to the previous and subsequent comments and are described in more detail in section 3.3.3.2.5, *Anadromous Fish Restoration*.

A-154 Comment: Interior (pp. 20 and 21), NMFS (p. 39), and Cal Fish & Game (p. 29) note that, although the draft EIS includes general provisions for tribes and agencies to participate in the development of the anadromous fish restoration plan, it is unclear who would do the radio-telemetry and screw trap analyses or what criteria would be used. Interior (p. 76) and NMFS (p. 61) also state that it is unclear how depositing a small number of adult Chinook salmon into a stream reach and then sampling outmigration, as suggested on page 3-299, lines 1-7, of the draft EIS, would produce a clear understanding of the overall production capability of an individual watershed (e.g., Shovel Creek). Perhaps capping redds and investigating egg to fry success would indicate the quality of spawning habitat, but the proposed investigation in no way would answer how much spawning habitat exists and how many spawners can be accommodated. PacifiCorp (p. 2-5), commenting on our recommendation 9S in the draft EIS for an evaluation of juvenile fall Chinook salmon production in identified spawning and rearing habitat by using screw traps located near the mouths of each reach or tributary, states that such an evaluation would not answer the question of reach productivity.

Response: As discussed in our responses to the two preceding comments, we modified the Staff Alternative to include an integrated fish passage and disease management program that is designed to implement the immediate restoration of anadromous fish to habitat upstream of Iron Gate dam, gather information needed to address key critical uncertainties related to fish passage and project effects on fish disease, and identify and implement feasible and appropriate restoration measures to address project effects on all anadromous fish species in a timely manner. The alternative would also require PacifiCorp to fund and participate in an advisory committee formed of interested agencies, tribes, and NGOs to guide plan implementation, and to fund the implementation of all studies, monitoring, and measures that are warranted and feasible to address project effects on anadromous fish, including access to habitat within and upstream of the project. PacifiCorp would be required to file annual reports with the Commission that would describe actions taken in the past year, provide a summary of monitoring studies conducted to date, and describe actions planned for the next year. A preliminary draft of each annual report would be distributed to the advisory committee for comment, and the revised draft report filed with the Commission would include copies of any agency comments on the plan and describe how these comments were addressed in the revised draft filed with the Commission. The Commission would reserve authority to require PacifiCorp to revise implementation of planned actions described in the draft annual report, if warranted.

A-155 Comment: Oregon Fish & Wildlife comments (p. 16) that there is a conflict of interest that undermines the credibility of PacifiCorp conducting a series of studies on which to base conclusions regarding fish passage feasibility and success as it pertains to the staff-recommended anadromous fish restoration approach. The ALJ concludes that the Miller radio-telemetry study may not have been comprehensive enough. Oregon Fish & Wildlife states it is skeptical that PacifiCorp would conduct studies using an adaptive management process that validates reintroduction of anadromous fish.

Response: See our response to comment A-154. Note that we would require PacifiCorp to form an advisory committee to guide plan implementation, and that committee members would have the opportunity to comment on annual implementation reports that would be submitted to the Commission.

This process would provide agencies, tribes, and NGOs with the opportunity to comment on any aspects associated with study design, study execution, monitoring, or the development or implementation of measures to address project effects on anadromous fish. We rely on comments from consulted entities to identify issues that may exist with studies and reserve the authority to modify plans prior to their implementation.

A-156 Comment: The Klamath Tribes (pp. 15-16) state that resident tribal, state, and federal experts, not the Commission, should design and implement an anadromous fish restoration program, and program implementation should be substantially or entirely funded by PacifiCorp. The tribal reintroduction program already in place provides a solid basis from which to move into careful planning and implementation of a strategic approach to reintroduction that targets the appropriate geographic scale (above and below Upper Klamath Lake) and temporal scale (decades, rather than the 3 years in the Commission alternative), as well as appropriate metrics for quantifying success. The EIS should simply recommend that PacifiCorp fund a reintroduction program that would be designed and implemented collaboratively by the tribes, states, and federal agencies.

Response: We expanded section 3.3.3.2.5, *Anadromous Fish Restoration*, to include evaluation of the restoration approach described in the tribe's conceptual restoration plan and related 10(a) recommendations. We identify several practical limitations to the approaches described by the tribe. These include the loss of funding for restoration activities if the dams are removed, inability to continue operation of Iron Gate Hatchery with the loss of its source of cool water from Iron Gate reservoir, the potential for continued losses of fall Chinook salmon and the potential basin-wide collapse of the fishery if dam removal does not resolve water quality and disease-related losses, and our judgment that it would be inappropriate to require PacifiCorp to fund habitat restoration in upstream areas that have not been affected by the project Our recommended integrated fish passage and disease management plan would be developed with input from resource agencies, the tribes, and the Commission's technical experts.

A-157 Comment: Conservation Groups (p. 11) state that, although the adaptive approach recommended in the draft EIS leading to trap and haul to selected river reaches provides some incremental increase in habitat for targeted anadromous fishes, it could fall well short of increasing habitat redundancy and certainly falls short of providing habitat connectivity to the full range of affected species. This would leave the success of restoration efforts for those targeted species uncomfortably dependent on the whims of ecological and geological processes that could constrain fish production in the selected stream reach due to no fault of PacifiCorp and ignores restoration efforts for any non-targeted species, such as Klamath River lamprey, Klamath largescale sucker, and Klamath smallscale sucker. Conservation Groups state that our recommended approach is not sustainable or feasible, in its opinion.

Response: As we describe in our response to preceding comments, the revised Staff Alternative includes an integrated fish passage and disease management program that would require PacifiCorp to address critical uncertainties related to project effects on fish disease and alternative approaches to restore anadromous fish species to habitat within and upstream of the project. The approach that is ultimately selected for restoring passage for anadromous fish would provide ancillary benefits to resident fish species, although we acknowledge that it may not provide full habitat connectivity for all project reaches. The plan would focus on implementing the approach that is most beneficial to anadromous fish species, which are of great importance to commercial, recreational, and tribal fisheries. The plan also would require PacifiCorp to conduct studies and monitoring efforts to identify and implement the most beneficial and feasible methods to address adverse project effects on the spawning and rearing life stages of anadromous and resident fish in project bypassed reaches and in the J.C. Boyle peaking reach.

A-158 Comment: California Indian Basketweavers Association (p. 3) states that the trap and haul approach to anadromous fish restoration in the Staff Alternative does not mitigate for degraded or blocked

habitat for lamprey, steelhead, sturgeon, and coho salmon. Similarly, Josh Strange (pp. 6 and 7) states that a trap and haul proposal for fish passage is biologically indefensible and has a negligible probability of successfully introducing anadromous fish (including spring and fall Chinook salmon, coho salmon, steelhead, green sturgeon, and Pacific lamprey) to the Upper Klamath Basin regardless of habitat conditions. He bases this conclusion on poor performance of similar programs elsewhere and additional challenges that would be unique to the Klamath River.

Response: We maintain that the same challenges unique to the Klamath River may apply to the effectiveness of volitional passage, as well as to a trap and haul approach to anadromous fish passage. As indicated in prior responses to comments, we include an integrated fish passage and disease management program in the revised Staff Alternative that is designed to implement the immediate restoration of anadromous fish to habitat upstream of Iron Gate dam, gather information needed to address key critical uncertainties related to fish passage and project effects on fish disease, and identify and implement appropriate restoration measures for all anadromous fish species in a timely manner. We note, however, that the distribution of green sturgeon in the Klamath River appears to be limited to areas downstream of Ishi Pishi Falls, so measures to implement passage of this species at the project may not be needed or appropriate.

A-159 Comment: PacifiCorp (pp. 2-5, 3-52, and 3-54), commenting on our discussion on page 3-299 and recommendation 8S in the draft EIS for an initial 3 year adult monitoring program to assess anadromous fish restoration potential in project reaches, comments that 3 years may not provide sufficient time to develop credible scientific evidence on fish behavior in reservoirs. Klamath Tribes (p. 15) comment that 3 years of such an experimental program is an absurdly short time scale over which to make judgments regarding the success or failure of such efforts. Mainstem river reaches upstream of Iron Gate dam are deficient in spawning gravel, so launching an experimental reintroduction program when the gravel augmentation has not been in place long enough to re-create significant spawning habitat within the project reaches seems likely to result in a predictable failure of the experimental program, in which case no reach would be deemed "promising." PacifiCorp further comments that it is the number of adults produced, not juveniles, that determines reach productivity and potential, and smaller smolts entering Copco reservoir may be too small for radio-tags. PacifiCorp also notes that, based on the level of proof required to meet the reliable evidence criteria set forth by the ALJ, PacifiCorp's 5 years of research identified in its alternative fishway prescriptions, also may be insufficient. Nevertheless, PacifiCorp still concludes that an adaptive approach using results of well-designed experiments to site fish passage facilities is a better approach to restoring anadromous fish than the fishway prescriptions.

Response: As we describe in previous responses, we include an integrated fish passage and disease management program in the revised Staff Alternative designed to implement the immediate restoration of anadromous fish to habitat upstream of Iron Gate dam, gather information to address key critical uncertainties related to fish passage and project effects on water quality and fish disease, and identify and implement appropriate restoration measures for all anadromous fish species in a timely manner. In section 3.3.3.2.5, *Anadromous Fish Restoration*, we describe an initial 3-year study program that could be extended, if needed, to address any critical uncertainties that remain before long-term commitments are made to a specific approach for restoring fish passage or addressing project effects on water quality and fish disease. The timeline for initial studies and provisions for extending these studies could also be refined during development of the Phase I implementation plan, which would guide these initial study efforts.

A-160 Comment: PacifiCorp (p. 2-6), commenting on our recommendation 10S in the draft EIS, states that if the resource agency objective behind volitional fish passage measures is to establish self-sustaining anadromous fish populations that can support tribal, recreational, and commercial harvest, our adaptive approach for selecting a single reach for initial restoration efforts would not address anadromous fish

production or sustainability. PacifiCorp points out that the Fish Passage Technical Workgroup evaluated several upstream and downstream passage options at each facility and these options are included in the license application.

Response: We considered the upstream and downstream passage options that were evaluated by the work group. Our analysis determined, however, that the potential for successfully restoring anadromous fish and the most effective methods for providing fish passage depends on resolving several critical uncertainties regarding the ability of smolts to migrate through project reservoirs and riverine reaches. The revised Staff Alternative includes an adaptive management approach that would address these critical uncertainties, which would help to identify the most feasible and appropriate approach for providing passage for anadromous fish at each of the project dams. It would also improve our ability to assess the size and sustainability of anadromous fish runs that could be restored by implementing passage using volitional or trap and haul approaches.

A-161 Comment: Oregon Fish & Wildlife states (p. 28-29) that, in the preliminary determinations of inconsistency, referenced in section 5.4 of the draft EIS, Commission staff provides no analysis of the potential economic, recreational, cultural, or ecological benefits of anadromous fish reintroduction. The only reference to costs or benefits is the Commission's unsupported and unexplained estimate of the cost of implementing anadromous fish passage measures (draft EIS table 4-3, p. 4-2). The draft EIS further justifies its rejection of anadromous passage recommendations because of several of PacifiCorp's unsupported arguments regarding downstream juvenile migration, disease, residualism, lack of suitable stocks, water quality, etc. Oregon Fish & Wildlife concludes that many of the same parameters apply equally to trap and haul operations.

Response: We acknowledge and discuss the potential benefits of measures to protect and restore anadromous fisheries, including the benefits of providing fish passage, in sections 3.3.3.2.3, *Disease Management*, 3.3.3.2.5, *Anadromous Fish Restoration*, 5.2.6, *Anadromous Fish Restoration*, and 5.2.7, *Fish Disease Management*, of this EIS. We also discuss benefits to fish-eating wildlife, recreation, tribal cultures, and socioeconomic benefits of protecting and restoring anadromous fish in other sections of the EIS, and summarize these benefits in tables ES-1 and 5-1. However, in sections 3.3.3.2.5 and 5.2.6, we also discuss critical uncertainties regarding reservoir passage and disease management that must be addressed before the potential benefits of alternative approaches for implementing passage at Copco and Iron Gate reservoirs can be evaluated with confidence. This analysis includes consideration of information that was filed on these subjects with the record from the EPAct 2005 proceeding. These uncertainties would be addressed as part of the integrated fish passage and disease management program that we present in this EIS.

A-162 Comment: Oregon Fish & Wildlife (p. 30) comments that the draft EIS rejects Oregon Fish & Wildlife's recommendation that volitional fish passage be implemented, since restoration would require a cooperative effort between PacifiCorp, Reclamation, and other stakeholders. The draft EIS gives little explanation for this other than that it does not think PacifiCorp should have to address other obstacles such as water quality conditions in Upper Klamath Lake and Keno reservoir. Oregon Fish & Wildlife, Cal Fish & Game (p. 28), Interior (pp. 15-16), and NMFS (p. 34) agree restoration will take considerable effort by many stakeholders, but the principal project impacts that constrain anadromous fish are the lack of fish passage at project facilities to an estimated 300 to 600 miles of habitat and the release of degraded water quality below the project. NMFS (p. 65) and Cal Fish & Game (p. 29) comment that by stating that other entities should be responsible for addressing measures that relate to gaining access to habitat upstream of the project, the draft EIS ignores and detracts from the responsibility of PacifiCorp to mitigate for blocking anadromous and resident fish movements upstream of the project. The conclusion that others should address upstream habitat issues also neglects the Commission's FPA responsibilities for consistency with the Fish and Wildlife Coordination Act and tribal trust responsibilities. Oregon Fish

& Wildlife states that the project has been one of the biggest contributing factors to the decline of Klamath River salmon and steelhead. Perhaps the most significant impact of the project has been to extirpate salmon and steelhead from their historic and important upstream habitat. If passage is not implemented at the project, then this significant impact will remain un-mitigated. There is a clear project impact on salmon and steelhead, and thus a clear obligation for PacifiCorp to take steps to restore those species. The draft EIS does not specify actions to fully mitigate these impacts. If the Commission is unable or unwilling to require dam removal, then the only means by which PacifiCorp can effectively address its impact is by full volitional fish passage, with safe, effective and timely facilities.

Response: As discussed in our responses to previous comments, we modified the Staff Alternative to include an integrated fish passage and disease management program designed to implement the immediate restoration of anadromous fish to habitat upstream of Iron Gate dam, gather information needed to address key critical uncertainties related to fish passage and project effects on fish disease, and identify and implement feasible and appropriate restoration measures to address project effects on all anadromous fish species in a timely manner. The Staff Alternative would also require PacifiCorp to fund and participate in an advisory committee of interested agencies, tribes, and NGOs to guide plan implementation, and to fund the implementation of all studies, monitoring, and measures that are warranted and feasible to address project effects on anadromous fish, including access to habitat within and upstream of the project. PacifiCorp would be required to file annual reports with the Commission that describe actions taken in the past year, provide a summary of monitoring studies conducted to date, and describe actions planned for the next year. A preliminary draft of each annual report would be distributed to the advisory committee for comment. The revised draft report, filed with the Commission, would include copies of any agency comments on the plan and describe how these comments were addressed in the revised draft. The Commission would reserve authority to require PacifiCorp to revise implementation of planned actions described in the draft annual report, if warranted. Our recommended integrated fish passage and disease management program does not ignore PacifiCorp's responsibility to provide upstream and downstream passage of migratory fish that have been blocked by project dams.

A-163 Comment: The Hoopa Valley Tribe (p. 32) and Klamath Tribes (p. 10) comment that the Staff Alternative is not consistent with the Inter-Tribal Fisheries Reintroduction Plan, as this plan concluded that it was reasonable to (1) proceed with active reintroduction of fall Chinook salmon; (2) defer reintroduction of steelhead until after volitional passage is provided; and (3) proceed with active reintroduction of spring Chinook and coho salmon upon final development of a reintroduction strategy. In contrast to the Staff Alternative, the reintroduction plan calls for volitional passage and for reintroduction efforts to begin immediately, not after 3 more years of reach-specific telemetry studies. Glossing over the reintroduction plan in the draft EIS is inconsistent with the Commission's statutory mandates, is arbitrary, and must be corrected.

Response: As discussed in preceding responses, we modified the Staff Alternative to include an integrated fish passage and disease management program, which is designed to proceed immediately with the introduction of anadromous fish to habitat upstream of Iron Gate dam, combined with an aggressive study program designed to address key critical uncertainties that must be addressed to identify the most beneficial approach for providing downstream passage past each development. The plan includes provisions for assessing the immediate and delayed survival of adult and juvenile fish transported over different distances and released at different locations in the river, and comparison of these survival rates with volitional passage. We describe this program in detail in 3.3.3.2.5, *Anadromous Fish Restoration.*

A-164 Comment: Interior (p. 20) comments that the draft EIS conclusion that volitional fishways were not included in the Staff Alternative because of the lower predicted returns and considerably higher costs focuses only on the cost of the mitigation and the impact of the mitigation on project profitability. The EIS needs to provide information regarding the assumptions regarding all costs associated with an

adequate trap and haul program, and to consider the benefits to all fish species, including the recovery of federally listed coho salmon that would be associated with each alternative.

Response: The integrated fish passage and disease management program included in the revised Staff Alternative defines an aggressive study program to address key critical uncertainties to determine and implement the most beneficial approach for restoring anadromous fish to habitat within and upstream of the project. The plan includes provisions for assessing the immediate and delayed survival of adult and juvenile fish transported over different distances and released at different locations in the river, and comparison of these survival rates with volitional passage. Our cost estimate for the integrated program includes capital costs of $2.8 million to improve adult collection facilities at Iron Gate dam, $2.0 million to implement ladder improvements at J.C. Boyle, $39.4 million to construct a screening facility at J.C. Boyle, $39.4 million for an assumed screening/collection facility at the head of Copco No. 1 reservoir, $8.8 million for water quality, microcystin and disease monitoring, $1.8 million for disease control studies and measures, $1.4 million for fish passage studies, and $1.4 million in lost energy costs associated with experimental spills and reservoir drawdown studies.

A-165 Comment: NMFS (p. 38) comments that the draft EIS conclusion that fish passage would be too costly is subjective. The pre-design cost estimates provided by CH2M Hill represent only "ball park estimates" with a wide range of uncertainty given the adaptive nature of the proposed program. Similarly scaled cost estimates have not been generated for trap-and-transport operations. Therefore, NMFS finds the dismissal of volitional passage on the basis of cost has no merit at this point in time.

Response: Although we recognize that PacifiCorp's cost estimates for volitional passage and trap and haul operations are approximate, we reviewed its estimates and find them to be reasonable.

A-166 Comment: NMFS (p. 38) comments that the Commission should recognize that the amortized operations and maintenance costs of volitional fish passage facilities, once installed, require less active operations by personnel than a trap and haul operation, which are consistently more labor and energy intensive. Comparable production from a trap-and-transport scheme may entail substantial hidden costs associated with improving roads or other infrastructure.

Response: See our response to the preceding comment and A-165. We maintain that any comparison of fish production benefits to costs associated with the NMFS/Interior fishway prescription and PacifiCorp's alternative prescriptions are highly speculative until solutions to fish disease losses in the Lower Klamath River have been identified and implemented. We also maintain that critical uncertainties regarding the feasibility of reservoir passage for smolts must also be resolved before the potential biological and societal benefits of NMFS/Interior's fishway prescription can be assessed.

A-167 Comment: Joyce King (p. 1) comments that the draft EIS did not seem to consider the cumulative effects of changes in natural, especially climatic, conditions that are well documented, including global warming and the Pacific Decadal Oscillation Cycle.

Response: We did consider the ongoing long-term trend of increasing temperatures in the basin, which forms part of our basis for our concern that losses from disease may increase in severity in the future if they are not addressed. Although we recognize the effects of the Decadal Oscillation Cycle on ocean productivity, cyclical effects on marine survival are not integral to the primary issues that must be addressed in this proceeding. We modified section 5.2.6, *Anadromous Fish Restoration*, to acknowledge that increasing the abundance and geographic distribution of anadromous fish would increase their resiliency to increasing temperature trends as well as cyclical changes in marine productivity, and we modified the caption of figure 3-56 to note that the escapement of fall Chinook salmon appears to reflect cyclical changes in marine survival.

A-168 Comment: Joyce King (p. 1) states that the draft EIS does not seem to analyze the percent of Klamath River salmon that normally stray and the effect of Klamath River salmon declines on statewide efforts to restore wild salmon populations in other coastal streams.

Response: To our knowledge, straying of Klamath River salmon into other coastal streams was not identified as an issue of concern during scoping for this proceeding. This issue may be addressed in the hatchery and genetics management plan (HGMP) under development by NMFS and Cal Fish & Game.

A-169 Comment: Joyce King (p. 2) states that the draft EIS does not seem to specify how the timeframes of projects and mitigations would intersect with and avoid coming too late to prevent dangerous constriction of gene pools of species at risk.

Response: As discussed in the preceding responses, we modified the Staff Alternative to include an integrated fish passage and disease management program that is designed to proceed immediately with the reintroduction of anadromous fish to habitat within and upstream of the project, undertake an aggressive study program designed to determine the most beneficial approach to restoring passage for anadromous fish, and implement appropriate restoration measures in a timely and expeditious manner.

A-170 Comment: The Hoopa Valley Tribe (p. 44) notes that in 2000, Interior, with the concurrence of the Tribe, approved the Trinity River Mainstem Fishery Restoration Record of Decision. As we point out on page 3-16 of the draft EIS, this program implements flow releases and other management measures with the goal of restoring fish and wildlife populations to the Trinity River Basin. The Hoopa Valley Tribe comments the draft EIS improperly fails to consider how relicensing of this project would affect the Tribe's efforts to restore anadromous fish in the Trinity River.

Response: As discussed in the preceding responses, we modified the Staff Alternative to include an integrated fish passage and disease management program that provides an aggressive timeline for evaluating project effects on disease incidence in the Klamath River downstream of Iron Gate dam, evaluating and implementing measures to alleviate project-related effects on the incidence of disease, and measures to identify and address project-related effects on downstream water quality. Development and implementation of effective measures for controlling fish disease and addressing project-related water quality effects in the lower Klamath River would provide a substantial benefit to Chinook salmon fisheries in the Trinity River Basin because all salmon that enter and leave the Trinity River pass through the lower Klamath River.

Iron Gate Hatchery Operations

A-171 Comment: Interior (p. 77) and NMFS (p. 61) comment that the draft EIS conclusion on page 3-303, line 39 (in response to Siskiyou County's concern), that differences in relative fitness between hatchery fish and wild fish are inconclusive and that additional study is needed, is not consistent with and undermines the management objectives of the Klamath River Basin Fisheries Task Force's Long Range Plan for the Klamath River Basin Fisheries Conservation Area Fisheries Restoration Program. The objectives of the Long Range Plan specify that (1) increases in populations of self-sustaining runs of fish separate in time or space from hatchery stocks, referred to here as "native populations," will be the basis upon which the success of the Restoration Program is judged and (2) the Task Force work with the Klamath Fisheries Management Council to protect locally adapted anadromous fish stocks that return to all areas of the Klamath Basin, so that self-sustaining runs can be restored, with emphasis given to priority stocks for recovery. Siskiyou County was a member of the Task Force and signatory to the Long Range Plan.

Response: The comment on page 3-303 was in response to Siskiyou County's request that we require resolution of the question of relative fitness between hatchery and wild populations of fish. We cite a recent report by NMFS (Berekikian and Ford, 2004) which concludes that more study is necessary to conclusively answer this question, and furthermore we conclude that such research is outside the purview of the Commission. The development of hatchery and genetics management plan for Iron Gate Hatchery by Cal Fish & Game in consultation with NMFS would result in hatchery production strategies that are in line with fisheries management agency goals and objectives, and we presume this would include the restoration of native populations in the Klamath River.

A-172 Comment: American Whitewater (pp. 7, 8 and 10) states that we should not consider hatchery operations or hatchery-derived fish as ecologically meaningful. Hatcheries have not, do not, and will not restore wild salmon and steelhead runs. Evidence supporting this position is the continued decline of wild salmon stocks using the Klamath River basin despite several decades of hatchery operations. Hatcheries support fishing, but not fish, because hatchery fish are inferior and different from wild fish. Terry Bendock (p. 1) considers the past experience with hatcheries from Alaska to California demonstrates them to be an ineffective tool for recovering and sustaining salmon in abundance.

Response: Hatcheries can play a role in restoring wild salmon runs in some cases (for example, in captive broodstock and conservation hatchery programs). We indicate in our response to A-147, that many of the adult fall Chinook salmon that return to spawn in Bogus Creek are believed to be strays from Iron Gate Hatchery. We agree that the primary purpose of Iron Gate Hatchery is to support recreational, commercial, and tribal harvest fisheries. We recognize that hatchery operations may have adverse effects on naturally produced fish, although the development and implementation of an HGMP should help to limit these adverse effects. However, we do not rely on hatchery operations as a substitute for the restoration of wild salmon and steelhead runs. As we discuss in more detail in our response to comment A-153, we modified the Staff Alternative to include an integrated fish passage and disease management program designed to implement the immediate restoration of anadromous fish to habitat upstream of Iron Gate dam, gather information needed to address key critical uncertainties related to fish passage and project effects on fish disease, and identify and implement feasible and appropriate restoration measures to address project effects on all anadromous fish species in a timely manner.

A-173 Comment: Cal Fish & Game (p. 37) comments that it recommended that 25 percent of fall Chinook salmon from the Iron Gate Hatchery be marked prior to release, but we recommend that 100 percent of the released fall Chinook salmon (consistent with the 10(j) recommendation of NMFS). Cal Fish & Game has logistical concerns with marking 100 percent of the release fall Chinook salmon because using one Auto Fish System trailer, it would take 50 work days to mark 6,000,000 Chinook salmon (two 8–hour shifts/day). The stress on the fish from being crowded more often and for longer durations could result in stressed fish, which could exacerbate disease problems. In addition, mass marking would not be able to begin until the fish reach minimum sizes, compressing the window of time available to mark the fish prior to releasing them into the Klamath River under suitable conditions. Our EIS should consider these specific issues raised by Cal Fish & Game hatchery staff. PacifiCorp (p. 3-54) also points out that PacifiCorp, Cal Fish & Game, and FWS all recommended 25 percent marking of fall Chinook salmon and only NMFS recommended 100 percent marking.

Response: Our recommended alternative to fund 100 percent marking of Chinook salmon includes costs of acquiring additional marking facilities and staff sufficient to successfully implement this measure (i.e., $233,880 for 25 percent marking versus $705,040 for 100 percent marking (draft EIS, page 5-69). We also note that resumption of the yearling fall Chinook salmon program would reduce the number of fish to be marked during the subyearling release period. We discuss the advantages of marking 100 percent of fall Chinook salmon compared to only marking 25 percent in section 3.3.3.2.6, *Iron Gate Hatchery Operations*, of the EIS and expect the logistical concerns that this may cause to be resolvable.

A-174 Comment: PacifiCorp (pp. 2-6 and 5-11) comments that its obligation to rehabilitate the Fall Creek Hatchery, as provided for in our recommendation 15S, should be contingent on the outcome of the anadromous fish reintroduction program. PacifiCorp states (pp. 2-6, 3-54, 5-9, and 5-11) that it should not be required to fund hatchery production and provide fish passage at the same time or, at a minimum, if reintroduction of anadromous fish into the project area is successful, there should be a decrease in hatchery mitigation on a species by species basis.

Response: The hatchery programs funded by PacifiCorp are intended to mitigate for natural production lost when Iron Gate dam was constructed, but do not account for production lost when Copco No. 1 dam was constructed. If efforts to restore natural production as required by any new license are successful; however, we concur with PacifiCorp that its obligation to continue hatchery operations should be re-evaluated. Such efforts would likely take a number of years, and until monitoring results of reintroduction efforts are known, we recommend that PacifiCorp fund the Fall Creek refurbishment and operations.

A-175 Comment: Interior (p. 31), NMFS (pp. 44 and 45), and Cal Fish & Game (pp. 37-39) comment that the draft EIS needs to adequately analyze alternatives to mitigating impacts of the project with and without an HGMP. Cal Fish & Game and NMFS are currently developing an HGMP for Iron Gate Hatchery, in accordance with the 4(d) rule of the Endangered Species Act. This agency task and responsibility is distinct from the subsequent implementation of the approved HGMP. Implementation of an approved HGMP is essential for continued operations at Iron Gate Hatchery and PacifiCorp's ability to meet mitigation responsibilities. Cal Fish & Game estimates that the cost of executing the provisions of the HGMP will be on the order of $3.5 million a year, rather than the $503,370 annually that we estimated in the draft EIS. Funding the execution of the tasks specified by the 4(d) rule of the ESA is solely the responsibility of the entity (PacifiCorp) required to build and operate the hatchery as mitigation for project impacts and our EIS should reflect this funding responsibility. Cal Fish & Game would also consider the cost of implementing the HGMP to be appropriately included in the cost to fully fund hatchery operations, which we recommended in the draft EIS.

Response: We recognize that an HGMP would be required to meet ESA requirements if operation of Iron Gate Hatchery is to continue through the term of a new license. Although Cal Fish & Game provided no breakdown of its cost estimate for HGMP implementation, we presume that its cost estimate reflects the measures that are currently under consideration as part of the HGMP, and updated our cost estimate accordingly. We note, however, that much of the information on the distribution and abundance of adult anadromous salmonids is already collected as part of normal fisheries management efforts, and it would not be appropriate for PacifiCorp to fund surveys that are needed and are already conducted for management purposes. We also note that if Iron Gate dam is removed, implementation of the plan by PacifiCorp would no longer be required because the hatchery would no longer be operated as mitigation for the construction of Iron Gate dam.

A-176 Comment: The Forest Service (p. 3 of 4) agrees with our recommendation to fully fund Iron Gate Hatchery and mark 100 percent of juvenile Chinook and coho salmon releases, but also recommends that we require the following provisions in a new license: (1) develop and practice conservation hatchery techniques; (2) develop an HGMP, as recommended by NMFS and Cal Fish & Game: (3) operate the hatchery to closely mimic the habitat stocks that it replaces; and (4) develop basin-wide fish production goals that consider natural stock robustness and hatchery needs. If monitoring of the above activities does not demonstrate wild fish recovery because of hatchery-related practices, the Forest Service indicates that other possible recommendations could include shutting down the hatchery for 3 years and monitoring the response of wild populations or relocation of the hatchery.

Response: Cal Fish & Game and NMFS are currently preparing an HGMP for Iron Gate Hatchery. Development of the HGMP would serve as the guidance document for how the hatchery would be operated. Development of 'basin-wide fish production goals' is the responsibility of the fisheries management agencies, not the Commission or PacifiCorp.

Habitat Enhancement, Monitoring, and Adaptive Management

A-177 Comment: Interior (pp. 31 and 32) comments the replacement of irrigation diversions in the J.C. Boyle peaking reach and elimination of existing irrigation diversions on Shovel Creek, and its tributary Negro Creek, would be beneficial to resident trout. However, while Interior assumes that the screened pump diversion system would withdraw water from the Klamath River; no information is provided to confirm the 15 cfs addition to Shovel Creek estimated during irrigation season. The EIS needs to clearly identify the alternative to the current irrigation system and source of water, specify how fish in the source water would be protected, provide the analysis for the estimate of the 15 cfs to be returned to Shovel Creek, and provide information on whether this water would remain in the creek or be diverted by another downstream riparian user. Measures to ensure that riparian ownership would be maintained and that this mitigation would stay in place for the term of the license need to be considered.

Response: On page 3-172 of the draft EIS we state: "Up to 15 cfs is currently diverted from Shovel Creek and Negro Creek (a tributary of Shovel Creek) for irrigation purposes during the summer, when fry would be present in both streams." The source of this information is PacifiCorp's license application. Currently, Shovel and Negro creeks are not in the project boundary and diversion of water from these streams for irrigation is not related to the project. We have no basis to confirm PacifiCorp's estimate of current irrigation withdrawals. As we state in section 3.3.3.2.7, *Habitat Enhancement,* of the draft EIS, PacifiCorp proposes to replace unscreened gravity-fed diversions in the J.C. Boyle peaking reach with screened pump systems and to eliminate existing diversions on Shovel Creek and its tributary, Negro Creek. PacifiCorp owns all the land on either side of Shovel Creek downstream of the diversions and we recommend its inclusion in a new project boundary. Therefore, Shovel Creek would become "project waters" and any diversions would require Commission approval. PacifiCorp's proposed measure to eliminate existing diversions from these two streams would increase streamflow by the up to 15 cfs formerly diverted irrigation flows. We consider this proposed measure to be a habitat enhancement regardless of the specific quantity of irrigation flows that would be foregone. In addition, any diversion of surface water from Shovel or Negro creeks, if not authorized by an existing water right, would require such approval from the Water Board. If included within the project boundary of a new license, the Commission would have the authority to ensure that riparian protection and enhancement measures specified in a new license are implemented and maintained over the term of the license.

A-178 Comment: Oregon Fish & Wildlife (pp. 186-190) states the Staff Alternative would result in the continuation of a significant amount of project-related cumulative impacts for the relicensed life of the project. Therefore, it is appropriate to require that a protection, mitigation, and enhancement plan be implemented that would review project impacts over time and continue to develop and implement mitigation measures to offset these effects on the aquatic community and fisheries. Oregon Fish & Wildlife recommends that we include an aquatic habitat enhancement plan in a new license that would identify projects for funding located in the Klamath Basin, including the project-affected reaches and tributaries, above Upper Klamath Lake and below the Iron Gate Dam on the Lower Klamath River. Oregon Fish & Wildlife recommended a similar plan in its preliminary 10(j) recommendations, but in the draft EIS (p. 5-71) we indicated that this recommendation was outside the scope of 10(j) because it was not a specific measure to protect fish and wildlife resources. To address this lack of specificity, Oregon Fish & Wildlife suggests that the following resource projects that would be funded by the Aquatic Enhancement Plan: (1) land acquisition or lease of riparian, wetlands, and uplands: (2) water rights acquisition or lease; (3) water conservation; (4) conservation easements; (5) construction of fish passage

facilities and removal of fish passage barriers; (6) instream habitat improvements; (7) riparian and wetland protection and enhancement; and (8) off-project recreation impacts. The plan would be developed in a collaborative format with PacifiCorp and stakeholder groups and administered by a governing board consisting of members from different stakeholder groups.

Response: Identifying a broad suite of measures that would be implemented, rather than the specific measures recommended for implementation, does not allow the Commission to weigh the costs and benefits of the recommended measures, nor does it demonstrate how the recommended measures would address the effects of the project. We have recommended the adoption of a large number of environmental measures in this EIS that would provide substantial environmental benefits to resources that are affected by the project. Adaptive components are included in some of our recommended measures that would enable adjustments of measures that are implemented in response to monitoring results.

A-179 Comment: PacifiCorp (p. 3-55) states that placement of gravel downstream of Iron Gate dam referenced on page 3-306 of the draft EIS appears to be in direct conflict with our purported objective of decreasing the density of fall Chinook salmon in the 13-mile reach downstream of Iron Gate dam (page 3-289, line 39). Increasing spawning gravel is likely to attract more spawners to the reach.

Response: Increasing the supply of gravel to the reach would increase the total spawnable area, especially after gravel has been redistributed by high flow events. This would allow fish that choose to spawn downstream of Iron Gate dam to disperse over a wider area and reduce the density of spawning activity in any given area.

A-180 Comment: Northcoast Environmental Center (p. 1) states that the draft EIS does not sufficiently analyze the potential adverse effects of our recommended gravel augmentation program. Where would the gravel come from? How many truckloads would be needed? How much fuel would be needed to transport the gravel? What would be the total financial and environmental costs of gravel extraction, loading, and transportation?

Response: We modified section 5.2.1, *Seasonal High Flows and Sediment Management*, to specify that PacifiCorp should file a draft sediment resource management plan within 1 year of license issuance that would identify the source of the sediment, the quantity, location, and frequency of sediment placement; and describe gravel and any other sediment mapping and monitoring studies to be conducted before and after sediment placement. The plan would be developed in consultation with NMFS, Oregon Fish & Wildlife, and the Klamath Basin Tribal Water Quality Work Group. This would allow the consulted parties and the Commission to consider the costs (including any adverse effects) of the measures that are proposed in the plan.

A-181 Comment: In response to Siskiyou County's recommendation that PacifiCorp fund about $26 million worth of fish and wildlife habitat enhancement programs by the Shasta Valley and Siskiyou resource conservation districts in tributaries downstream of Iron Gate dam, we state on page 5-44, lines 25-29, of the draft EIS: "Regarding measures that would improve habitat within tributaries, we acknowledge their potential benefits to anadromous fish, but we conclude that the condition of habitat within tributaries downstream of Iron Gate dam is not affected by the project facilities or operations. Accordingly, because of this lack of project nexus, we do not include Siskiyou County's recommendation in the Staff Alternative." Siskiyou County (p. 6) comments that in the draft EIS we concluded that the project affects sediment supply downstream of Iron Gate dam, which has a cumulative effect on riparian vegetation. The projects for which the county requests funding would address some of the habitat issues affected by the project, and therefore there is a sufficient nexus to the project to include this funding in a new license. Summaries of prioritized implementation projects in the Shasta and Scott river watersheds

are provided that include funding for organization and administration, habitat enhancements (increasing flows by water supply improvements and instream habitat measures), and fish passage protection (removal of diversion barriers, installation and maintenance of fish screens at diversions, and enhancement of fish passage at non-diversion barriers). The county notes that the cost for the programs for which it seeks funding has been reduced from $26 million to $18 million.

Response: The additional details that Siskiyou County provides as to how funding from PacifiCorp might be used to enhance fish and habitat downstream of Iron Gate dam pertain to administrative and enhancements that would be implemented within the Shasta and Scott River watersheds. Such watersheds, and the example projects offered by the county, are not directly influenced by project operations. Our recommended sediment augmentation measures, as well as the measures that we recommend for implementation as part of our integrated fish passage and disease management program would address effects that have an identified nexus to project operations.

A-182 Comment: Interior (pp.33 and 96), NMFS (pp. 46 and 66), and Oregon Fish & Wildlife (p. 194) comment that monitoring riverine fish populations in project-affected reaches at 5-year intervals, as we recommend in section 5.2.1.1 of the draft EIS, would not adequately assess population responses of coho salmon to changes in instream flow or passage related measures. The EIS needs to analyze an alternative in which monitoring proceeds at 3-year intervals coinciding with the peak year of abundance of federally listed coho salmon. Interior and NMFS also comment that more frequent monitoring of riverine fish populations than our recommended 5 year interval is justified because resident trout fisheries are not as good as portrayed in section 5.2.11 of the draft EIS. Interior and NMFS cite various ALJ findings to support their recommended 3-year riverine monitoring frequency. The agencies state that the EIS needs to completely describe the scope of the fisheries monitoring that would be required in a new license.

Response: We acknowledge that conducting population sampling at 3-year intervals would provide better information on population responses to measures that are implemented in the new license compared to the frequency of every 5 years as we recommend in the draft EIS, and we modified the Staff Alternative to include population monitoring at 3-year intervals in project reservoirs and reaches for the first 9 years after license issuance, with the frequency of monitoring to be re-evaluated after the third survey. We also include annual monitoring of the number of fish that are collected or passing fish passage facilities at the mainstem developments as part of our recommended integrated fish passage and disease management plan, which would provide information on trends in coho salmon abundance. We note that adult returns of coho salmon to Klamath basin tributaries and hatcheries shown in figures 3-41, 3-46, and 3-54 of the draft EIS show little evidence of a 3-year cyclical pattern in abundance.

A-183 Comment: NMFS (p. 27) now recommends that PacifiCorp perform a comprehensive fisheries assessment of the project-affected reaches annually for the first 5 years, and then every 5 years for the term of the license, as without adequate testing of the success of flow restoration, there is little basis for concluding that improvements in flow management are adequate.

Response: We do not concur that comprehensive fisheries surveys are warranted at this level of frequency to evaluate the effects of operational measures. We conclude that population surveys every third year for the first 9 years, annual monitoring of fish passing each fishway or trap and haul facility that is installed, and monitoring of fish stranding would provide adequate information on population responses to changes in operations, the implementation of fish passage, and other environmental measures including sediment augmentation. We conclude that three cycles of monitoring fish populations in project reservoirs and reaches at 3-year intervals would provide a sound basis for considering whether any additional adjustments in project operations are warranted.

A-184 Comment: Interior comments (p. 34) they do not concur with the statement that resident trout monitoring is not justified in Scotch, Camp, Shovel, Long Prairie, and Spencer creeks because spawning habitat in these creeks is not affected by project operations (draft EIS, 5-45, lines 40-43). Resident trout survival and reproduction is affected by the lack of fish passage among these habitat areas and the mainstem Klamath River, which is blocked by the project. Therefore, the continuing impacts to fish passage and its effects on the resident fish populations should be monitored and mitigated. Several ALJ findings confirm this position. The EIS needs to adequately analyze monitoring of the number and size of spawning redband trout in Scotch, Camp, Shovel, Long Prairie, and Spencer creeks.

Response: Construction of the project has affected resident trout in the tributaries that Interior specifies by inundating portions of the tributaries and by reducing connectivity among trout populations within the project area. However, due to the very high cost of implementing fish passage measures, it is appropriate for decisions regarding implementation of fish passage to be based primarily on benefits to anadromous fish, which have enormous value to commercial, recreational, and tribal fisheries. We do not support expending effort on monitoring unless the results of the monitoring would be useful for guiding the future implementation or refinement of measures that are included in a new license. We see no such basis for monitoring resident trout production in these tributaries.

A-185 Comment: Interior (p. 35), NMFS (p. 46), the Forest Service (p. 4 of 4), and Oregon Fish & Wildlife (p. 199) state they concur the license should require monitoring of anadromous fish populations as a component of an anadromous fish restoration plan (page 5-46, line 11). The draft EIS does not completely describe the scope of the fisheries monitoring that would be required in the license; therefore, it is not possible to provide a complete review of the adequacy of the monitoring provisions of 12S and 18S (draft EIS, page 5-7). The Forest Service specifically indicates that the geographic scope of measure 18S is unclear in the draft EIS and the plan scope should explicitly include the project-affected reaches downstream of the project area, as well as project reaches. The Commission should use the monitoring results to reduce impacts on fish, especially wild stocks, and continue to reduce project effects through adaptive application, as necessary. The Forest Service suggests that Upper Klamath River Basin fish models (EDT and KlamRAS) could be adapted for lower river assessment to guide changes to operations or facilities during the term of a new license.

Response: We recommend monitoring of the distribution and usage of spawning gravel that would be augmented downstream of Iron Gate dam. In addition, we include an extensive water quality, microcystin and disease monitoring plan as part of the integrated fish passage and disease management program that we now include in the Staff Alternative. We also expanded our description of monitoring elements that are included in the Staff Alternatives in sections 3 and 5 of this EIS. We are unclear on what kinds of changes in project operations or facilities the Forest Service envisions evaluating with the EDT or KlamRAS models.

A-186 Comment: Interior (p. 35) and NMFS (p. 46) comment that the draft EIS states monitoring number and species of fish that are passed or transported via any fish passage facilities should provide sufficient information on the status and trends of reintroduced populations (page 5-46, line 15). Interior and NMFS state that monitoring only the number of fish at fishways would limit the ability to discern changes in population responses of anadromous fish to non-passage related measures and limit the ability to evaluate the overall fate of anadromous fish passing through the project. The draft EIS did not adequately consider the types of monitoring which can identify the origins and history of individual fish to assess their overall fate in migrating through the project, both as outmigrants and as returning adults. The draft EIS fails to analyze the value of these technical monitoring tools and their usefulness in making informed decisions regarding optimal management of water and fish migration through the project. Monitoring gives both anadromous fish and water managers the tools needed to make informed decisions

regarding project operations and fish migration. This information will be critical to anadromous restoration efforts, water management, and decisions regarding power generation.

Response: We modified the Staff Alternative to include several additional monitoring efforts. The integrated fish passage and disease management program includes at least 3 years of telemetry studies on the migration of adult anadromous fish, which would be used to evaluate transport and migration survival, the effectiveness of upstream passage facilities, migration to spawning grounds, and survival until spawning. The integrated plan would also include juvenile telemetry studies to determine transport and migration survival, survival during migration through project reservoirs, and survival rates for passing each development via alternative passage routes (spill, turbines, screens, or truck transport). Juvenile telemetry studies would also be used to assess delayed survival of smolts trucked for different distances and released at different locations in the lower Klamath River, including locations upstream and downstream of the suspected zone of high *C. shasta* infection upstream of the Shasta River. Finally, we include stranding monitoring in the J.C. Boyle peaking reach in at least the first 3 years after license issuance to evaluate the need for additional ramping restrictions and population monitoring in all project reaches at 3-year intervals for at least the first 9 years after license issuance to evaluate recruitment and reach productivity.

A-187 Comment: PacifiCorp (p. 5-20) notes that we list item 70 in table 5-2 of the Oregon Fish & Wildlife 10(j) recommendation to include in its aquatic monitoring resource management plan an adaptive management strategy for the J.C. Boyle bypassed and peaking reach, and item 71 that lists the NMFS and FWS 10(j) recommendation to include in its anadromous fish monitoring resource management plan protocols for estimating the number, size, sex, timing, survival, and origin of fish returning to Iron Gate dam; the size of the spawning populations in key tributaries, the number of outmigrating juvenile Chinook salmon from these key tributaries; and implementing measures to meet project passage goals. PacifiCorp states that the agencies have not identified resource goals for the areas that would be monitored.

Response: In its letter providing recommended terms and conditions for the project, Oregon Fish & Wildlife states the following resource goals and objectives for Klamath River fish populations: to maintain and restore habitat including instream flows and natural hydrology to support healthy native aquatic species including indigenous trout, sucker, lamprey and anadromous salmonids. Habitat parameters must remain within the range that maintains the biological requirements to support productivity, growth, reproduction, and migration of native fish. Fish survival, growth, egg incubation, and emergence are related to quantity and quality of habitat, so if the project affects these parameters, fish populations and their health are affected. We agree that the scope of monitoring efforts listed by NMFS and FWS appear to exceed what is needed to measure attainment of their stated resource goals and objectives, and have not adopted elements that would not be relevant to address the impacts of the project.

A-188 Comment: PacifiCorp (p. 3-55), commenting on page 3-308, line 34, of the draft EIS, sees a need for monitoring fish only if an adaptive approach to establishing fish passage facilities and flow regimes is implemented. If agency prescriptions are implemented as prescribed, monitoring should not be needed, as the agencies have set no metrics to judge benefits or performance. PacifiCorp's monitoring should be limited to that needed for compliance, and biological monitoring should be the responsibility of agencies.

Response: Biological monitoring is appropriate to ensure that the facilities are functioning as intended, and to identify any modifications or maintenance procedures that are needed to provide effective passage.

A-189 Comment: PacifiCorp (pp. 3-55 and 5-12), commenting on page 3-309, line 20, and section 5.2.11, *Aquatic Resources Monitoring*, of the draft EIS, agrees that if a trap and haul anadromous fish

restoration program is implemented, fish marking would be vital for determining fish passage survival rates. However, PacifiCorp sees no need to implement a fish tagging program or otherwise collecting population status and trend data if a prescriptive volitional fish passage program is implemented, since the data collected would be used for agency management purposes only, and would not be used for decision making (the prescriptions would be mandatory). However, PacifiCorp would be willing to fund tagging activities to estimate the number of juvenile or adult fish passing Iron Gate dam if fish production upstream of the project counted toward reducing hatchery production requirements over time.

Response: We expect that some marking and population monitoring studies would still be needed if a prescriptive volitional fish passage program is implemented, although the scope of these studies would be much more limited than if an adaptive approach was implemented. Some marking studies would be beneficial to evaluate delayed mortality of fish from any injuries that may occur during passage through fish screening facilities, and some marking studies may be needed in conjunction with monitoring of disease losses during migration through the lower Klamath River. In addition, monitoring of fish populations in project reaches as described in section 5.2.11, *Aquatic Resources Monitoring*, would still be required to evaluate fish stranding and project effects on recruitment and reach productivity.

A-190 Comment: PacifiCorp (p. 2-6) concludes that our recommended aquatic resources monitoring and management plan (measure 18S) would be redundant with our recommended fish passage resource management plan (measure 12S) and our sponsorship of a fishery technical advisory committee (measure 16S).

Response: The three identified measures are not redundant. The aquatic resources monitoring and management plan would focus on monitoring to assess the ongoing effects of project operations on aquatic habitat. The fish passage resource management plan would involve the development of designs for any fishways that are included in a new license, provisions for developing fishway operation and maintenance plans, provisions for evaluating and monitoring fish passage at the fishways, and provisions for modifying the fishways in response to evaluation and monitoring. Both of these are written plans that would be developed with review and input from the fishery technical advisory committee. We chose to identify sponsoring the administrative costs of the committee as a separate measure from the plans that the committee would oversee.

TERRESTRIAL RESOURCES

T-1 Comment: Interior (p. 77) comments that our discussion of snag and coarse wood rich habitat on page 3-321 of the draft EIS should include the white-headed woodpecker (a Bureau of Land Management sensitive species).

Response: To determine if the Klamath Falls Resource Management Plan guidelines for snag maintenance were met in the project area, PacifiCorp analyzed the snag requirements for six primary cavity-nesting species known from the project vicinity to use snags of different sizes and decay classes. In section 3.3.4.1.2, *Wildlife Resources*, we identify eight species of woodpeckers at the project, including the white-headed woodpecker. We modified our discussion of snag and coarse wood rich habitat in section 3.3.4.1.1 of this EIS to clarify that PacifiCorp determined the project vicinity provides sufficient snags for the six primary cavity nesting species occurring there. In its final technical report on wildlife resources, PacifiCorp notes that white-headed woodpeckers use snags averaging about 18 inches in diameter for breeding. It determined that 1.4+/- 3.7 snags more than or equal to 17 inches in diameter occurred in the ponderosa pine cover type within the project vicinity. PacifiCorp also notes that white-headed woodpeckers are likely to occur in the large stands of ponderosa pine with suitable snag densities located near the J.C. Boyle reservoir and throughout the project vicinity.

T-2 Comment: On page 3-326, lines 6 and 7, of our draft EIS, we state that "…Interior suggested that this EIS should address impacts of roads on pygmy monkey flower (*Mimulus rubellus*)." Interior (p. 77) notes that, according to the Jepson Manual, *Mimulus rubellus* is found in washes in mountainous areas of central and southern California east of the Sierra Nevada Mountains and in the Mojave Desert and does not have a common name. Interior asserts that pygmy monkeyflower is *Mimulus pygmaeus* which has been documented in south central Oregon and northern California. However, this species was dropped from the ORNHIC lists because it was too common.

Response: Interior did not provide a scientific name for pygmy monkey flower in its scoping comment letter dated July 22, 2004. According to the Calflora website (www.calflora.org), *Mimulus rubellus* is the scientific name for pygmy monkey flower, and *Mimulus pygmaeus* is the scientific name for Egg Lake monkeyflower. The Jepson Manual does not provide a common name for *Mimulus rubellus*; the common name it provides for *Mimulus pygmaeus* is Egg Lake monkeyflower. Table 3-79 in the draft EIS lists Egg Lake monkeyflower as one of the special status plant species known to occur in the vicinity of the project. In our review of the CNPS inventory (cnps.web.aplus.net) for this species in March 2007, we learned that CNPS now includes *Mimulus pygmaeus* on its List 4 and considers the species fairly endangered in California. We modified table 3-79 in this EIS to reflect this updated information.

T-3 Comment: Interior (p. 77), commenting on page 3-343, line 43, of the draft EIS, states that the inventory conducted by PacifiCorp for noxious weeds was adequate on the lands surveyed, thus a new survey is not needed. However, Interior notes that the inventory was limited in geographic scope and therefore does not provide a good basis for an integrated noxious weed management plan on all of the lands owned by PacifiCorp, including coordination with other landowners in the area.

Response: In section 3.3.4.2.1, *Vegetation Management/Noxious and Invasive Species Control*, of the draft EIS, we agree that successful weed control requires a cooperative effort by all landowners and land managers in the vicinity. Section 5.2.12, *Vegetation Management*, recommends that PacifiCorp develop and implement a vegetation resources management plan addressing lands within the project boundary and along access roads for which PacifiCorp has shared or sole responsibility for maintaining. We also recommend that PacifiCorp consult with agencies, tribes, and local landowners to develop the plan. The need for additional surveys on lands adjacent to the project, and the appropriate party to conduct any such surveys, would be addressed during consultation.

T-4 Comment: On page 5-47, lines 13-15, of the draft EIS, we state "…fluctuating reservoir levels, water releases, and altered hydrology in the project reaches may favor noxious and invasive plant species." PacifiCorp (p. 5-3) points out that, although project operations can influence vegetation in the varial zone in peaking reaches and drawdown zones along project reservoirs, with the exception of reed canarygrass (considered an invasive species), noxious weeds in the project area generally occur higher along the banks and outside the zones of project flow-related influence.

Response: We recognize that PacifiCorp did not document any noxious weeds in either the varial zones of the project peaking reaches or the drawdown zones of the project reservoirs. We modified our discussion in section 5.2.12, *Vegetation Management*, in this EIS to indicate that varying water levels may favor invasive plant species but not noxious weeds.

T-5 Comment: Interior (pp. 36, 77, 78, and 97), commenting on our description of PacifiCorp's alternative to the Bureau of Land Management's 4(e) condition on page 3-343 of the draft EIS, indicates that PacifiCorp proposes to limit the noxious weed management portion of its proposed vegetation management plan to areas needed for project operations within the project boundary. Other landowners are required by state and county laws and regulations to manage noxious weeds on all their lands. It is not clear to Interior why PacifiCorp thinks that it should be exempt from these requirements. The effects

of limiting weed management to only a portion of PacifiCorp's land ownership should be analyzed and disclosed in the EIS.

Response: In section 5.2.12, *Vegetation Management*, we recommend that PacifiCorp develop and implement a vegetation resources management plan for all lands within the project boundary and along the access roads for which PacifiCorp has shared or sole responsibility for maintaining. PacifiCorp may be required by the state and counties to manage noxious weeds on all of their lands, but the Commission's jurisdiction is limited to those lands within the project boundary; therefore, any license issued for the project would only address lands within the project boundary. We see no indication that PacifiCorp considers itself exempt from noxious weed regulations that apply to its non-project property.

T-6 Comment: On page 3-345, lines 40-42, of the draft EIS, we state: "Implementation of weed control measures on adjacent non-project lands would help reduce the risk of spread of weed infestations. We agree that weed management on lands affected by project operations is necessary to control the spread of invasive plants." Interior (p. 78) states that these two sentences seem to conflict because the first acknowledges that noxious weed control on adjacent "non-project" lands is beneficial, while the second sentence only recognizes the value of weed management on "…lands affected by Project operations…" Interior asks us to clarify which statement is correct.

Response: We see no conflict with the statements in these two indicated sentences. Cooperation would maximize the chance for successful weed control in the project vicinity on a number of land ownerships, both public and private. During consultation on the vegetation resources management plan for the project, we anticipate that lands outside of the project boundary would also be addressed by the various entities. However, any license issued by the Commission for the project would only address lands within the project boundary. The impetus for noxious weed monitoring and control measures outside the project boundary would generally need to come from the state and county regulations, rather than conditions of a new license.

T-7 Comment: PacifiCorp (pp. 3-56 and 5-12) states that it would cooperate with other land owners and managers to coordinate weed management activities on adjacent land (e.g., coordinate target species treatment methods, and timing), as we suggest on page 3-345 and in section 5.2.12, *Vegetation Management*. However, it states that, under routine circumstances, PacifiCorp should not be responsible for weed control and other vegetation management measures beyond the project boundary especially if there is no clear project nexus. Interior (p. 77) comments that it is hard to determine the effects of the project with or without the vegetation management plan. Further, it is hard to determine where the proposed vegetation management plan would be applied on the ground.

Response: We agree with PacifiCorp and note that the terms and conditions of any license issued by the Commission for the project would only address those lands within the project boundary. PacifiCorp may enter into an agreement with other entities for lands outside of the project boundary; however, the terms of such an agreement would not be included in any license issued by the Commission for this project. In response to Interior's comment about the effects of the project with and without the vegetation management plan, we maintain that since PacifiCorp and other entities with property within and adjacent to the project boundary already engage in vegetation management practices, it would be virtually impossible to quantify the incremental difference on vegetation with and without our recommended management plan. Our recommended plan is designed to formalize practices that in some instances may already be ongoing and ensure that specific issues that have arisen during the relicensing process are addressed. In the case of vegetation management, rather than Commission staff specifying the exact measures that should be implemented at any one location we consider it much more appropriate to enable the expertise of resource and land management agencies to be drawn upon when considering appropriate vegetation management techniques and where those techniques would be applied.

T-8 Comment: Page 3-345, lines 42-45, of the draft EIS, states: "Eradication may be attainable for species that are currently limited in distribution, but attempts to eradicate species that are already well-established and widespread, such as yellow starthistle, would not be likely to succeed, except at an unacceptably high cost to other resource values." Interior (p. 78) states that eradication is not the only objective of an integrated weed management program. For some species, limiting the impacts on resource recreational values may be a valuable objective even if eradication is not possible. An integrated management program would use a combination of methods to achieve this goal. A low probability of eradication is not an excuse for lack of management.

Response: In section 5.2.12, *Vegetation Management*, of the draft EIS we recommend PacifiCorp develop and implement a vegetation resources management plan that incorporates elements of vegetation management at all project facilities; noxious and invasive plant control; threatened, endangered, and sensitive plant protection; upland vegetation management; riparian and wetland habitat management; and long term monitoring. We do not recommend a stand-alone noxious weed management plan, nor do we suggest that eradication would be the sole objective of any management strategy. We agree with Interior that a combination of methods to achieve integrated noxious weed management is necessary, and on page 3-345, lines 41-42, of the draft EIS, we state: "We agree that weed management on lands affected by project operations is necessary to control the spread of invasive species." It is not clear how Interior concludes that we endorse a lack of management of weeds; to make our intent even clearer, we added the phrase "and noxious weeds" to the above sentence.

T-9 Comment: PacifiCorp (p. 3-56), commenting on pages 3-345, lines 47-49, and 3-346, lines 1-2, suggests that it could include cross references to the noxious weed section of the vegetation management plan from other license-related plans to make updating practices easier, rather than scattered practices among multiple plans.

Response: We consider PacifiCorp's suggestion reasonable and encourage PacifiCorp to cross reference its various resource management plans while preparing them.

T-10 Comment: PacifiCorp (pp. 2-1, 2-4, 5-1, and 5-12), commenting on pages 2-21, lines 5-6 (measure 25P), 2-46, lines 7-9, and 5-4, lines 2-11 (staff modifications to measure 26P), and section 5.2.13, *Wildlife Management*, states that its measures for "riparian habitat restoration" and deer winter range management were originally proposed as part of its "Wildlife Habitat Management Plan (measure 26P) because they were intended to enhance wildlife habitat. PacifiCorp's proposed vegetation resource management plan mostly contained project operation-related vegetation management activities, including a long-term monitoring component. PacifiCorp comments that moving deer winter management measures to the vegetation resource management plan should only be required if both plans are developed at the same time (within 2 years of license issuance), to allow integration of practices.

Response: We recognize that the vegetation resources and wildlife management plans are linked. In sections 5.2.12, *Vegetation Management*, and 5.2.13, *Wildlife Management*, of the draft EIS, we recommend that PacifiCorp develop the vegetation resources and wildlife management plans simultaneously to ensure that the appropriate aspects of each plan are integrated (see page 5-48, lines 11-16, and page 5-49, lines 34-40, of the draft EIS). We also recommend that PacifiCorp include long-term monitoring as a component of both the vegetation resources and wildlife management plans.

T-11 Comment: Interior (p. 78), commenting on the section on "Management of Upland Vegetation to Improve Forest Health" on page 3-346 of the draft EIS states: "PacifiCorp's analysis recognizes the changes in the condition of the vegetation that have developed as a result of past management actions and recognizes prescribed fire as an important tool to help achieve a more desirable condition. However,

other vegetation management tools used in combination with prescribed fire would facilitate the restoration of both healthy forests and more productive wildlife habitat."

Response: We agree that other tools, in addition to prescribed burning, are available for managing upland vegetation. We modified the discussion of management of upland vegetation to improve forest health in section 3.3.4.2.1 of this EIS to incorporate additional habitat management practices such as (1) thinning overstory vegetation to create openings and improve forage quality and quantity; (2) either seeding small openings with forage species or planting forage species seedlings in conjunction with prescribed fire or thinning; (3) maintaining or increasing areas with late-successional forest, particularly those with multi-canopy stands; (4) creating and/or protecting habitat for species that use cavities and snags; and (5) planting shrubs or creating other visual barriers along roads, rights-of-way, and open areas to provide wildlife cover.

T-12 Comment: PacifiCorp (pp. 3-56 and 5-1) commenting on the section on "Management of Upland Vegetation to Improve Forest Health" on page 3-346, and our modifications to measure 25P on page 5-4 of our draft EIS states: (1) it is not clear how the project has caused a detrimental increase in fire fuel loading in the project area or adjacent non-project lands, and it should therefore not be PacifiCorp's responsibility to reduce fuel loads, particularly on someone else's land; (2) PacifiCorp already conducts vegetation maintenance around project-related facilities to reduce the risk of fire to and from these areas; (3) considering the interspersed ownership surrounding PacifiCorp land, it would be impractical for PacifiCorp to implement controlled burning on a large scale; and (4) controlled burning poses more risk than other treatments that can accomplish similar objectives and PacifiCorp is concerned about added risks and liability associated with controlled burns.

Response: We did not intend to imply that the project was solely responsible for the increase in fire fuel loading in the project vicinity, only that fuels have accumulated over the years in the states of Oregon and California due to years of fire suppression. We recognize that there are several vegetation management tools that can be used to minimize the risk of catastrophic fires, including controlled burning. In section 5.2.12, *Vegetation Management*, of the EIS we recommend that PacifiCorp develop and implement a vegetation resources management plan in consultation with the agencies, tribes, and local landowners. During consultation on the vegetation resources management plan for the project, we anticipate that lands outside of the project boundary also would be addressed by the various entities; PacifiCorp may choose to cooperate with the agencies and private landowners on implementing prescribed burning on its lands and adjacent lands. However, any license issued by the Commission for the project would only address lands within the project boundary. Also, see our response to comment T-11.

T-13 Comment: PacifiCorp (pp. 2-4 and 3-56) agrees to our modifications to its proposed vegetation management plan on page 2-46, lines 2-6, and page 5-4, lines 6-9, of the draft EIS, that would require PacifiCorp to consult with appropriate tribes regarding culturally significant plant species that would be used during revegetation efforts and to expand the upland vegetation aspects of the plan to include measures that would be used to reduce fire fuels. However, PacifiCorp comments that the geographic scope of any such measures should be limited to lands within the project boundary, as such lands have a clear nexus to the project. PacifiCorp is not clear what we mean by "project-affected areas" in our modified recommended measure.

Response: In section 5.2.12, *Vegetation Management*, in the draft EIS, we recommend that PacifiCorp develop a vegetation resources management plan addressing aspects of vegetation management with a clear nexus to the project, which would generally include lands within the project boundary and access roads for which PacifiCorp has shared or sole responsibility for maintaining. Project-affected areas are those with a clear nexus to the project as described above.

T-14 Comment: Oregon Fish & Wildlife comments (p. 204) that the draft EIS did not fully disclose environmental effects on riparian communities and the scour zone of the Klamath River below project facilities across the four alternatives. Continued load following operations define the scour zone (shore and bottomland wetland cover type) and prevent long-term survival of a dense riparian community. The EIS indicates that, "without active management, it is unlikely that riparian habitat conditions would improve in the project area even with the proposed or recommended changes in the minimum flow releases and ramping rates" (draft EIS p. 3-347, lines 1-2). Then the EIS contradicts the preceding conclusion with the statement "Proposed flows would increase water velocities somewhat, decrease sediment deposition, and help further reduce encroachment of vegetation in the stream channel while promoting the establishment of beneficial vegetation on gravel bars, floodplains and terraces" (draft EIS p. 3-349, lines 10-12). Oregon Fish & Wildlife comments that continued low flows in the bypassed reaches and load following in the peaking reach with the recommended ramping rates would continue to cause the same project impacts, albeit reduced in a very small way from existing conditions.

Response: The first statement is intended to help define the issue of how project flows influence riparian vegetation. We modified it to read: "Regardless of the flow regime that may be specified in a new license, active management of riparian habitat may be necessary to notably improve conditions in the project area." Such active management may be necessary to ensure that invasive species do not diminish habitat benefits that may accrue with the implementing of various flow regimes proposed by PacifiCorp and recommended by various entities, in the second sentence referred to by Oregon Fish & Wildlife. Our analysis that follows the second sentence is intended to support the need for monitoring the vegetative response to an altered flow regime that may be specified in a new license to identify the need for remedial measures in an adaptive manner.

T-15 Comment: The city of Yreka (p. 5) requests that the recommended vegetation management plan include provisions to not add any deciduous vegetation upstream of the city's municipal water supply intakes. The city points out that the intake screens already require regular clearing, and if any additional deciduous vegetation should be planted, it could increase the city's maintenance costs at the intakes and fish screens. The city suggests that coniferous vegetation should be used for visual screening to avoid this potential problem.

Response: We added provisions to our recommended vegetation management plan as requested by the city.

T-16 Comment: The city of Yreka (p. 5) comments: "Will the city be subject, now or in the future, to creating and implementing such a vegetation management plan? The city should not have to bear these extra costs, nor can a requirement like this be imposed on the city, as a function of PacifiCorp's relicensing application."

Response: PacifiCorp would be solely responsible for developing and implementing any vegetation resources management plan that may be included as a condition of a new license.

T-17 Comment: Interior (p. 65) comments that, on page xxviii, line 22, of the draft EIS "vegetation resources management plan" should read "wildlife resources management plan." PacifiCorp (p. ES-1) states that it should read "wildlife habitat management plan."

Response: We acknowledge our error in listing the vegetation resources management plan twice in our listing of items in PacifiCorp's proposal. PacifiCorp proposes managing wildlife resources through the implementation of a wildlife habitat management plan. We modified this EIS to reflect this correction.

T-18 Comment: Oregon Fish & Wildlife (pp. 200 and 207) and Interior (p. 97) comment that section 5.2.12 on vegetation management is confusing and lacks focus. They comment that the summary of stakeholder conditions and proposals does little to clarify the Commission's conclusions and, to the contrary, makes it more difficult to determine what PacifiCorp proposes. In either case, they state it is not clear how this relates to the staff's conclusions on environmental effects.

Response: Section 5.2.12, *Vegetation Management*, provides an overview of PacifiCorp's proposal and the agencies' various recommendations and specifications related to vegetation management. Ultimately, we conclude that all proposals, recommendations, and specifications could be incorporated into a comprehensive vegetation resources management plan. Therefore, we recommend that PacifiCorp develop and implement a vegetation resources management plan in consultation with the agencies, tribes, and local landowners. We modified our discussion of the vegetation resources management plan in section 5.2.12 of this EIS to clarify our conclusions regarding the various elements of the plan.

T-19 Comment: Pacific Coast Federation of Fishermen's Associations et al. (p. 68) states that our EIS should analyze vegetation management for consistency with aquatic habitat enhancements and other similar salmonid and watershed restoration plans in the basin.

Response: We expect vegetation management practices that would specified in the final vegetation resources management plan submitted to the Commission for approval to be developed in consultation with appropriate state and federal resource agencies. As such, these agencies would be most familiar with ongoing aquatic habitat restoration plans elsewhere in the basin as well as those specific to the project and in the best position to ensure that the vegetation resources management plan is consistent with other ongoing aquatic enhancement initiatives.

T-20 Comment: Interior (p. 36) and Oregon Fish & Wildlife (p. 208) comment that the effects of the project on riparian vegetation, including the distribution and abundance of reed canarygrass, should be disclosed and discussed in section 5.2.12 of the EIS regardless of any value judgments on those effects.

Response: We discuss the current distribution of reed canarygrass in the project area in section 3.3.4.1.1 of the draft EIS under the subheading *Riparian and Wetland Habitats* and in table 3-78. The effects of the proposed flows on reed canarygrass are discussed in section 3.3.4.2.1, under the subheading *Riparian and Wetland Habitat Connectivity*. Section 5.2.12 discusses our recommended vegetation resources management plan, which would address noxious and invasive plant control as an element of the plan. It is extremely difficult to predict how the altered flows would affect the already established reed canarygrass. Therefore, we recommend monitoring as part of the vegetation resources management plan. Monitoring invasive plant species following implementation of the new flow regime would inform the development of appropriate adaptive management measures.

T-21 Comment: California Indian Basketweavers Association (p. 2) states that the EIS should identify plants used for weaving baskets and should address the effects of the project on them.

Response: Plants traditionally used by Native American groups in the Klamath River region are discussed in section 3.3.4.1.1 of the draft EIS under the subheading *Ethnobotanical Resources*. We understand that willow brush is a common basket-making material and discuss the current distribution of willow in the project area in section 3.3.4.1.1 under the subheading *Riparian and Wetland Habitats* and in table 3-78. The effects of the proposed flows on willow are discussed in section 3.3.4.2.1 under the subheading *Riparian and Wetland Habitat Connectivity*. Section 5.2.12 discusses our recommended vegetation resources management plan, which would be prepared in consultation with affected tribes to ensure that the plan addresses opportunities for re-establishment of plants of tribal significance in project-affected areas. As discussed in section 3.3.4.2.1, it is extremely difficult to predict how the recommended

altered flows would affect new willow establishment. Therefore, we recommend monitoring as part of the vegetation resources management plan. Monitoring vegetation response to the new flow regime would inform the development of appropriate adaptive management measures.

T-22 Comment: Oregon Fish & Wildlife (pp. 200, 207, and 208) comments that environmental measure 25P does not explicitly include consultation with resource agencies including federal land management and federal and state fish and wildlife agencies. Oregon Fish & Wildlife requests that we require that monitoring plans be developed with consultation and approval by the resource agencies, that they be designed to measure and adaptively mitigate all project impacts, and that timelines for their development and implementation be instituted. Further, it states that the EIS must provide an analysis of environmental effects on wildlife and botanical resources for each alternative identified in section 2.

Response: In sections 3.3.4.2.1, *Vegetation Management/Noxious and Invasive Species Control*, and 3.3.4.2.2, *Wildlife Management*, we conclude that PacifiCorp's consultation with various agencies during development of the vegetation management and wildlife management plans is appropriate. Therefore, we modified sections 5.2.12, *Vegetation Management*, and 5.2.13, *Wildlife Management*, of this EIS to include a recommendation that PacifiCorp consult with the agencies during development of the vegetation and wildlife management plans.

T-23 Comment: Interior (p. 36) generally concurs with the draft EIS analysis for wildlife management. Only a small portion of project lines do not meet raptor-safe guidelines, and Interior commends PacifiCorp for its efforts in this area. However, Interior goes on to observe that the potential for electrocution or collision at project transmission lines cannot be ruled out, even though none have been documented to date. Interior notes that the EIS should include the cost of developing the wildlife habitat management plan in coordination with the bald eagle management plan, and analyze and reconsider the costs of potential provisions for monitoring transmission lines and retrofitting poles on lines that do not meet the APLIC (2005) guidelines for avian protection. The current cost is listed as $0 (page A-30).

Response: In section 3.3.4.2.2 *Wildlife Resource Management*, we agree with Interior's assessment that the potential for electrocution or collision at project transmission lines cannot be ruled out. Table A-1 of the draft EIS lists the costs associated with preparing the wildlife management and bald eagle management plans. In sections 3.3.4.2.2, 5.1.1.2, and 5.2.13 we recommend development of a comprehensive wildlife management plan that includes provisions for monitoring transmission lines and retrofitting poles that do not meet the APLIC guidelines for avian protection; therefore, the cost of this element is included in the overall cost of developing the wildlife management plan. Also, in section 3.3.4.2.2 we note that PacifiCorp has been operating under its current bird power line management program guidelines and memorandums of understanding with Oregon Fish & Wildlife, Cal Fish & Game, and FWS for several years; therefore, this is an ongoing existing program and there would be no incremental cost associated with relicensing.

T-24 Comment: Interior (p. 78), commenting on page 3-354, lines 32-36, of the draft EIS (in the "*Wildlife Movement*" subsection), notes that PacifiCorp proposes to wait to finalize the road access management plan. It states that, therefore, the draft EIS does not identify what unnecessary roads would be closed or what seasonal restrictions would be established to protect and enhance wildlife movement. Interior asks how the effects from implementing road actions can be disclosed to the public if PacifiCorp waits to finalize the road access management plan.

Response: In this EIS, we identify the roads that PacifiCorp proposes closing in its October 2004 draft Project Roadway Management Plan. PacifiCorp did not identify any project roads it proposes to close seasonally in its draft plan (i.e., all roads proposed for closing would be closed on a permanent rather than a seasonal basis). In section 3.3.4.2.2, *Wildlife Resource Management*, of the EIS, we note that wildlife

would benefit from closing and restoring roads, due to the maintenance of wildlife habitat connectivity and limited opportunity for collisions with vehicles. We agree with PacifiCorp's assessment of the roads proposed for closure do not serve project purposes and recommend that they be removed from the project. PacifiCorp provides for the potential of seasonal road closures to protect wildlife during the finalization of the Project Roadway Management Plan. Although we do not recommend that any specific project roads be closed on a seasonal basis based on the information available in the record, consultation with resource and land management agencies during our recommended plan finalization would enable any such roads to be identified in the plan submitted to the Commission for approval.

T-25 Comment: PacifiCorp (p. 3-57), commenting on page 3-359, lines 22 and 44-49, of the draft EIS, states that its bird management program was updated in June 2006 and the practices are consistent with the latest 2005 Avian Protection Plan guidelines. PacifiCorp agrees to include provisions to allow for updating practices to the avian protection element of the wildlife habitat management plan.

Response: We appreciate the updated information and modified this EIS accordingly.

T-26 Comment: On page 3-359, lines 36 and 37, of the draft EIS, we state that the risk of avian electrocution or collision is low because "only one of PacifiCorp's support structures does not meet current Avian Power Line Interaction Committee guidelines." PacifiCorp (p. 3-57) comments that it would be more accurate to say "only one of PacifiCorp's Project-related transmission lines…"

Response: We understand that there are still a few poles associated with PacifiCorp's Line 15 (south of the Copco No. 2 bypassed reach) with configurations that do not meet current raptor electrocution safety standards, so we agree with PacifiCorp's suggested text change. We modified our discussion of avian transmission line protection to clearly state that only one of PacifiCorp's transmission lines does not meet current Avian Power Line Interaction Committee guidelines.

T-27 Comment: PacifiCorp (p. 3-57), commenting on page 3-360, lines 13-21, of the draft EIS, affirms that it will continue to support existing agreements and the most current spatial and temporal guidelines for avian protection.

Response: We appreciate PacifiCorp's cooperation in supporting existing agreements and the most current spatial and temporal guidelines for avian protection.

T-28 Comment: Oregon Fish & Wildlife (p. 212) states that, since the Staff Alternative in the draft EIS does not completely describe the scope of the wildlife management plan that would be required in the license, it is not possible to provide a complete review of the adequacy of the plan described in 26P (p. 5-4, lines 12-22, of the draft EIS). Given the information from the ALJ findings and the lack of specificity of the monitoring requirements, Oregon Fish & Wildlife recommends that monitoring plans be developed with consultation and approval by the resource agencies, that they be designed to measure and adaptively mitigate all project impacts, and that timelines for their development and implementation be instituted. In addition, Oregon Fish & Wildlife states that Commission staff must provide a comprehensive discussion of environmental effects on wildlife species and their habitats in the EIS. Further, staff must provide an analysis of environmental effects on wildlife and botanical resources for each alternative identified in section 2.

Response: In section 5.2.13, *Wildlife Management*, of the draft EIS, we recommend that PacifiCorp develop the wildlife management plan in consultation with the agencies. We also recommend including long-term monitoring as an element of the wildlife management plan. Although the draft EIS establishes a framework for the development of the wildlife management plan, we do not include detailed information about specific measures that should be incorporated into the plan, because the plan would

need to reflect goals and objectives that have not yet been determined. Detailed wildlife management measures would depend on site-specific conditions that are best addressed by local experts during recommended consultation for plan development.

T-29 Comment: PacifiCorp (pp. 2-8 and 5-2), commenting on the two dam removal alternative described in sections 2.3.4 and 5.1.1.4 of the EIS, states that, in addition to eliminating proposed wildlife enhancement measures that would be implemented at Copco reservoir, the wildlife resource management plan described in measure 26P should also eliminate wildlife measures at Iron Gate reservoir, because there would be no reservoir.

Response: We agree that, if Iron Gate dam was removed, Measure 26P would be modified to eliminate proposed wildlife enhancement measures at Iron Gate reservoir. We modified our discussion in section 5.1.1.4, *Retirement of Copco No. 1 and Iron Gate Developments with Staff Measures*, accordingly.

THREATENED AND ENDANGERED SPECIES

TE-1 Comment: NMFS (p. 61), commenting on our discussion of coho salmon on page 3-365 of the draft EIS, states that its intent in identifying specific dams in each ESU was to clarify the upstream extent of known occupied reaches for each ESU and to contrast these barriers with smaller, ephemeral barriers (e.g., culverts, push-up dams) that the agency does not view as impassable structures. NMFS does not intend to 'write off' potential habitats above these dams, but instead will fully consider the need to include these blocked habitats in the recovery planning process and in ESA section 7 consultations.

Response: Our statement on page 3-365, lines 33-36, of the draft EIS, defines the existing boundary of the ESU for coho salmon. We do not imply that habitat upstream of Iron Gate is not appropriate to consider for future restoration efforts. In this EIS we recommend implementation of an integrated fish passage and disease management program to enable coho salmon to be restored upstream of Iron Gate dam to suspected historic spawning habitat in Spencer Creek.

TE-2 Comment: Interior (p. 79) and NMFS (pp. 61 and 62), commenting on our description of coho salmon spawning habitat on page 3-378, lines 9-12, of the draft EIS, states that we disregard non-natal rearing opportunities that exist for mainstem spawned coho salmon fry, as well as coho salmon fry displaced into the mainstem from inhospitable tributary habitat (e.g., Shasta River in late April). Restoration efforts to improve juvenile fish access into cold water tributary mouths along the middle Klamath will likely receive funding through the California's restoration funding cycle this year.

Response: We modified the text in section 3.3.5.2.2, *Coho Salmon*, to include this information**.**

TE-3 Comment: PacifiCorp (p. 3-57), commenting on page 3-380, lines 6 and 7, of the draft EIS, states that PacifiCorp's alternative fishway prescription would allow federally listed suckers to be separated from anadromous smolts so they can be returned to the river. Any assumption that screened fish of all species would be collected, not sorted, and all trucked downstream is incorrect.

Response: The indicated text does not imply that federally listed suckers would be collected, not sorted, and trucked to downstream locations. Although some federally listed suckers are likely to pass project dams to downstream locations, most identified habitat for these species is upstream of the project, and we would not endorse intentionally moving suckers to downstream locations. Under the staff-recommended integrated fish passage and disease management program, after critical uncertainties relating to fish passage have been addressed, PacifiCorp would consult with stakeholders to develop a fish passage and disease management implementation plan for Commission approval that describes the schedule and approach for implementing fish passage, disease management, monitoring and study efforts to be

continued into the future, and provisions for adaptive management. The plan would address the handling and disposition of any federally listed suckers that are collected in passage facilities, which could be returned to the waters upstream or downstream of the facility, in accordance with input from Interior and other parties consulted during plan development.

TE-4 Comment: NMFS (p. 66) comments that the basis for determination of likely to adversely affect federally listed coho salmon and its critical habitat presented in table 5-4 of the draft EIS is that relicensing the project would provide "continued potential for adverse effects of low DO and project-related disease." NMFS says this list should include continued adverse effects of (1) blocked passage; (2) impacts on natural hydrologic variability; (3) hatchery operations; (4) impacts on water temperature; and (5) reduction of transport of coarse sediment that benefits spawning habitat for mainstem coho salmon. This list should include adverse effects of the Staff Alternative related to fish passage, e.g. collection, handling and transportation, delayed mortality, and reservoir effects on fish passage.

Response: We modified table 5-4 accordingly. We note, however, that operation of the project does not have a substantial influence on hydrologic variability in currently accessible habitat downstream of Iron Gate dam, and that most potential spawning and rearing habitat within the project area is in tributaries that are not affected by project operations, with the exception of reduced flows in Jenny Creek due to diversion from Spring Creek, decreased flows in Fall Creek in the short reach between the impassable falls and the powerhouse, and increased flows in Fall Creek downstream of the powerhouse.

TE-5 Comment: The Hoopa Valley Tribe (pp. 40 and 41) comments that our analysis in the draft EIS of critical habitat for coho salmon is deficient because the ESA prohibits federal agencies from approving actions that result in destruction or adverse modification of critical habitat. Adverse modification results if there is an appreciable diminishment in the value of the habitat for survival or recovery. The Staff Alternative in the draft EIS would result in adverse modification of critical habitat because it would likely continue to adversely affect water quality conditions downstream of Iron Gate dam, absent dam removal, which has the potential to adversely affect juvenile coho salmon during outmigration, as we indicate on page 3-387 of the draft EIS. The Hoopa Valley Tribe (p. 41) notes that on pages 5-57 and 5-58, we reject removal of Copco No. 1 and Iron Gate dams based solely on high cost. The tribe states that rejecting necessary measure to protect federally listed species, such as coho salmon, based on cost is impermissible under the ESA.

Response: Although we conclude in this EIS that the proposed action is likely to adversely affect the critical habitat of coho salmon, this determination means only that all effects of the proposed action are not "beneficial, discountable, or insignificant." NMFS will determine in its biological opinion whether the proposed action would result in the destruction or adverse modification of critical habitat, and whether the inclusion of reasonable and prudent measures or adoption of a reasonable and prudent alternative would avoid the destruction or adverse modification of critical habitat. We modified the Staff Alternative in this EIS to include an integrated fish passage and disease management program, which includes measures to better define project effects on critical habitat for coho salmon and to develop measures to address any adverse effects. This program includes extensive monitoring of water quality conditions, microcystin levels and pathogen densities throughout the length of the Klamath River downstream of Iron Gate dam and in the lower end of four of its major tributaries. This information, combined with implementation of test spills, flushing flows and reservoir drawdowns will help to define the contribution of the project to adverse water quality conditions and the incidence of disease and to identify measures that can be implemented to address adverse effects. The integrated program also includes the immediate restoration of passage to habitat within and upstream of the project, including the transport of coho salmon to Spencer Creek and collection of outmigrating smolts at J.C. Boyle for downstream transport. Regarding the Hoopa Valley Tribe's comment on the cost of dam removal, our analysis of this issue in section 5.2.21, *Dam Removal*, includes the discussion of other resource tradeoffs that were considered in

our evaluation of the costs and benefits of dam removal. All of these issues factored into our balancing call, which was not based solely on costs.

TE-6 Comment: The Hoopa Valley Tribe (pp. 41 and 42) states that the draft EIS fails to provide any substantive analysis of the existing BiOps relating to Reclamation's operation of the Klamath Irrigation Project and Link River dam. The EIS should evaluate whether the Staff Alternative or other alternatives are consistent with the governing NMFS BiOps.

Response: We have expanded the text in section 3.3.5 to include evaluation of the consistency of PacifiCorp's proposal and measures included in the Staff Alternative with the FWS and NMFS BiOps on Reclamation's operations.

TE-7 Comment: The Hoopa Valley Tribe (p. 42) states that the EIS should re-evaluate the impacts of this project on federally listed coho salmon in a separate biological assessment, which could be included as an appendix to the EIS, because of the importance of coho salmon recovery and the inadequacy of the analysis in the draft EIS.

Response: The Commission frequently uses its draft NEPA document as its biological assessment of effects on federally listed species, as was done in this case. The draft EIS includes all of the elements necessary for a biological assessment. Anadromous fish restoration upstream of Iron Gate dam is important for all species that are believed to have historically occurred upstream of the dam, including coho salmon. We specifically include coho salmon in our integrated fish passage and disease management program recommended in this EIS. Our decision to incorporate our biological assessment into our EIS does not diminish the importance of restoring coho salmon to its historical habitat.

TE-8 Comment: The Hoopa Valley (p. 43) and Klamath tribes (p. 13) state that section 3.3.5.4 of the draft EIS is misleading and inadequate because it characterizes the adverse impacts on coho salmon as "unavoidable" if "the project is relicensed without removal of Iron Gate and Copco No. 1 dams." Dam removal would avoid such adverse effects by mitigating adverse water quality effects that impair coho salmon recovery, and it is therefore not accurate to characterize such effects as "unavoidable."

Response: We do not believe that our statements in section 3.3.5.4 are misleading or inadequate. We state that if "the project is relicensed without removal of Iron Gate or Copco No. 1 dams, the project would likely continue to adversely affect water quality conditions downstream of Iron Gate dam, which has the potential to adversely affect juvenile coho salmon during their outmigration from tributaries to the lower Klamath River." It is clear that the project-related water quality effects we point out would not occur if Copco or Iron Gate dams are removed and not included in the license for a new project.

TE-9 Comment: The Hoopa Valley Tribe (pp. 44 and 45) and Klamath Tribes (pp. 13 and 14) state that the four paragraphs on pages 3-386 and 3-387 of the draft EIS provide limited analysis of the cumulative impacts faced by coho salmon, but provide no recommendations for mitigation. As such, they state this analysis is inadequate and recommend a thorough analysis of the significant cumulative impacts on federally listed coho salmon and other anadromous and affected species associated with Klamath River dams and irrigation, including the operation of the Klamath Irrigation Project. The EIS must recommend a way in which the cumulative impacts can be adequately mitigated, and if dam removal is the only option to mitigate those impacts, the Commission should support that option.
Response: We evaluate cumulative effects in the EIS to describe the context within which we must evaluate the potential adverse and beneficial effects of the proposed action. We include a wide range of measures in the Staff Alternative that are designed to address the primary adverse effects of the project in a manner that allows for continued power production and continuation of flows that are suitable for whitewater boating in the J.C. Boyle peaking reach. Given the substantial value and importance of the

anadromous fisheries resource and the substantial cumulative effects on anadromous fish from the Klamath Irrigation Project and the Klamath Hydroelectric Project, we focused most of our effort on developing measures that would help to sustain and enhance this resource. In our view, it is appropriate for the operators of both the water project and the hydroelectric project to provide substantive protection and enhancement measures for each project's contribution to these cumulative effects.

TE-10 Comment: In section 5.6.5, *Essential Fish Habitat*, of the draft EIS, we conclude that with six measures proposed by PacifiCorp and five additional measures that we recommend that would benefit Essential Fish Habitat, there was a sufficient basis to render a determination that the Staff Alternative would not adversely affect Essential Fish Habitat. NMFS (p. 66) comments that the draft EIS provides scant information to support this determination and that the Staff Alternative provides little assurances that the impacts of the project on Essential Fish Habitat of Chinook salmon, including effects on water quality, hydrologic variability, and impairment to historic habitat, would be mitigated to the extent to warrant a "not likely to adversely affect" determination.

Response: We have substantially expanded the level of water quality monitoring that we include in the Staff Alternative to better understand the effects of the project on water quality and fish disease. In our recommended integrated fish passage and disease management program, described in detail in section 3.3.3.2.5, *Anadromous Fish Restoration*, of this EIS, we also include a drawdown test that would evaluate the potential benefits of implementing a substantial pulse flow as a means to flush and remove pathogens and attached algae that provides habitat for *C. shasta*'s polychaete alternate host. We also include adaptive components that would allow a fisheries technical advisory committee to modify the monitoring program or to test alternative treatments for controlling fish diseases in the lower Klamath River. We do not concur that the project affects hydrologic variability downstream of Iron Gate dam, because the hydroelectric project does not have enough storage to affect the seasonal flow regime, which is controlled by releases from Link River that are made according to Reclamation's annual operating plans.

TE-11 Comment: Interior (p. 79), commenting on section 3.3.5.2.5 of the draft EIS states that, since Applegate's milk-vetch is federally listed as endangered, the new site documented by PacifiCorp's surveys should be included in its special status plant species management plan, regardless of the project boundary. The plan could include a cooperative management agreement with FWS, Oregon Department of Agriculture, and the Nature Conservancy to monitor and perhaps manage this site such that it could be included in the recovery efforts for this critically endangered plant. Judging from the description of the site in the draft EIS, this site may be less subject to threats than the much larger Ewauna Flat site managed by the Nature Conservancy.

Response: We agree that monitoring the population of Applegate's milk-vetch along Keno reservoir would provide information on its status, and managing the population may ensure its survival and development. However, PacifiCorp proposes removing the Keno development from the project boundary and if that occurs, this population of Applegate's milk-vetch would no longer be within the project boundary and not within the Commission's jurisdiction. If the Commission declares the Keno development jurisdictional at relicensing, this population would be within the project boundary and measures to protect it would be specified in our recommended vegetation resource management plan.

In its recovery plan for Applegate's milk-vetch, FWS proposes preserving extant Applegate's milk-vetch populations by securing their locations through purchase, development of legally binding conservation agreements between landowners and the FWS, or similar arrangements with other public or private conservation organizations. It is possible that FWS would pursue preservation of this population of Applegate's milk-vetch if it were no longer within the project boundary.

TE-12 Comment: Interior (p. 79), commenting on the description of a large communal roost of bald eagles near the project on page 3-371, line 15, of the draft EIS, states that Worden is in Oregon, not California.

Response: We acknowledge our error and recognize that Worden is in Oregon, not in California. We modified this EIS accordingly.

TE-13 Comment: PacifiCorp (p. 3-57), commenting on our listing of potential project influences on bald eagles on page 3-382, lines 14-16 (collisions with transmission lines, disturbance from project recreation, and diminishment of prey availability), states that these are all generic potential effects. PacifiCorp states that no bald eagle collisions with project transmission lines have been documented since it implemented its Raptor Electrocution Reduction Program in the late 1980s. PacifiCorp also states there have been no documented impacts on bald eagles from recreation at project reservoirs or along the peaking reach and project operations are not likely to result in an overall reduction in prey base availability in the project area.

Response: We agree that the potential project influences on bald eagles listed in section 3.3.5.2.7, *Bald Eagle*, of the draft EIS is generic and could apply to any hydroelectric project. The indicated text is meant only to define the issue, not identify specific effects at the project. In sections 3.3.5.1.9, *Bald Eagle*, and 3.3.5.2.7, we note that no eagle collisions or electrocutions have been reported on the project transmission lines since the introduction of PacifiCorp's Raptor Electrocution Reduction Program in the late 1980s. In section 3.3.5.2.7, we acknowledge that the proposed project could potentially benefit the bald eagle by enhancing its prey base.

TE-14 Comment: On page 3-383, lines 16-23, of the draft EIS, we state that PacifiCorp proposes monitoring and protection measures that would document any new nests, preserve roosting and perching trees, and monitor productivity of known nests to determine if any further environmental protection measures are needed. We further indicate that these proposed measures, when implemented as part of a bald eagle management plan, would ensure that increased recreation is not adversely affecting bald eagles and if project-related activities are adversely influencing bald eagle productivity, the bald eagle management plan would provide a mechanism to implement further protective measures. Given these statements in the draft EIS, PacifiCorp (pp. 3-58, 5-20, and 5-21) asks us to clarify why we concluded in section 5.6.4 that relicensing the project is likely to adversely affect the bald eagle. PacifiCorp provides reasons why it concludes that such a finding is unwarranted and that project-related effects on bald eagles are insignificant.

Response: Even though there are no documented bald eagle mortalities due to electrocutions or collisions along the project transmission lines, it could happen in the future, particularly since Line 15 south of the Copco No. 2 bypassed reach still has a few poles with configurations that do not meet current raptor electrocution safety standards. Also, if the project is licensed there would be substantial new construction including fish passage facilities and new recreation facilities. Bald eagles are sensitive to disturbance and could potentially be disturbed by proposed construction activities, as well as by the likely increase in recreation visitors at the project. Bald eagles were delisted in June 2007 and therefore are no longer subject to protection under the Endangered Species Act but would continue to be protected under the Bald and Golden Eagle Protection Act and Migratory Bird Treat Act, as we now indicate in section 3.3.5.1.9, *Bald* Eagle, of this EIS.

TE-15 Comment: On page 3-383, lines 26-31, of the draft EIS, we state that, with implementation of a bald eagle management plan, existing nesting territories would be protected from project management activities, such as major maintenance and vegetation management, during sensitive nesting periods by closing areas around nest sites during the period of sensitivity. PacifiCorp (p. 3-58) agrees that it is

important to protect existing nest sites from human disturbance. However, because no nests are with the project boundary or on PacifiCorp-owned land, it is not clear how PacifiCorp can implement seasonal closures at nests during the breeding season. Nest sites on the Bureau of Land Management's lands would continue to be protected by that agency, but PacifiCorp has no authority over other landowners. PacifiCorp states that, within the project boundary, portions of existing nesting territories would be protected from project-related recreation or management activities during sensitive nesting periods.

Response: We recognize that there are currently no known bald eagle nests within the project boundary and acknowledge that the Bureau of Land Management specified seasonal restrictions for active nest sites on lands that it manages, not on PacifiCorp land. We modified our discussion of the measures proposed by PacifiCorp and the Bureau of Land Management to clarify their intentions relative to protecting bald eagles.

TE-16 Comment: Commenting on page 3-384, lines 4-10, of the draft EIS, PacifiCorp (p. 3-59) states that it would describe avian collision and electrocution hazard avoidance measures in the wildlife habitat management plan, rather than in a separate plan.

Response: In sections 5.1.1.2, *Staff Alternative*, and 5.2.13, *Wildlife Management*, of the draft EIS, we recommend including provisions for monitoring transmission lines and retrofitting poles to improve avian protection in the Wildlife Management Plan for the project. Some of the agencies recommend a separate plan addressing avian collision and electrocution hazard avoidance. In section 5.2.13, we recommend developing one comprehensive wildlife management plan; each wildlife management element (or plan) could be included as a separate section or chapter.

TE-17 Comment: Our recommended measure 19S, described on page 5-7 of the draft EIS, would require PacifiCorp to develop a bald eagle management plan within 2 years of license issuance. PacifiCorp (p. 5-1) states that, if this is to be a separate document, it should be prepared in coordination with the wildlife habitat management plan, which would include raptor protection measures.

Response: Item 19S in section 5.1.1.2, *Staff Alternative*, recommends preparing the bald eagle management plan in coordination with the wildlife habitat management plan. It may be possible to incorporate bald eagle management as a section or chapter of the overall wildlife management plan, but we would expect PacifiCorp and the agencies to resolve this issue during consultation and development of the plan or plans.

TE-18 Comment: An element of our recommended bald eagle management plan (measure 19S on page 5-7 of the draft EIS) would include "evaluating changes in prey base relationships." PacifiCorp (p. 5-1) states that, although the scope and purpose of this monitoring is unclear, it assumes it is related to monitoring changes as anadromous fish are reintroduced. PacifiCorp does not believe that this measure would be useful because bald eagles are opportunistic foragers and would likely exploit any resources available to them in the future.

Response: Section 3.3.5.1.9, *Bald Eagle*, of the draft EIS, notes that prey remains observed under successful bald eagle nests in the project vicinity are indicative of the foraging habitats used by bald eagles and confirm that they are opportunistic foragers. Waterfowl, gull, and fish remains were found under nests in proximity to either reservoirs or a reach of the river while small mammal remains were found under nests farther away from any water body. In section 5.2.1.1, *Aquatic Resources Monitoring*, we recommend monitoring riverine and reservoir fish populations which would enable monitoring of the bald eagle prey base most likely to be influenced by the relicensing of the project. By examining prey base relationships as part of the bald eagle management plan, we would be able to assess changes that may have occurred as a result of implementing conditions of a new project license. However, we do not

anticipate any decrease in the bald eagle prey base as a result of implementing conditions of a new project license. Our recommended monitoring would identify any unforeseen decrease in the prey base.

RECREATIONAL RESOURCES

Affected Environment

R-1 Comment: PacifiCorp (p. 3-59), commenting on table 3-85 in the draft EIS, states that the Pit River has just one long reach with flat water. The main barrier to its use is lack of flows. PacifiCorp also states that the Salmon, Scott, and Smith rivers have lower use because they have low flows after mid-June in most years.

Response: On page 4-45 of PacifiCorp's Recreation Resources Final Technical Report, it states: "The run from Nubieber to Pittville is 24 miles, has a significant amount of flatwater… Downstream of Fall River Mills to the town of Big Bend, the river contains several Pacific Gas and Electric Company hydroelectric facilities, with a few shorter runs between them. The Pit is less popular because of its general location, its long reaches of flatwater above Fall River Mills, and its fragmented nature and lack of water below Fall River Mills." We note that the Pit 1 dam creates a substantial area of flatwater in MacArthur Swamp, and Lake Britton, formed by Pit 3 dam, represents several miles of flatwater; therefore our characterization of the Pit River in table 3-85 is accurate. In addition, we point out on page 3-390, lines 8-10, that the only two rivers in the region that provide year-round flows adequate for boating are the Klamath and the Rogue.

R-2 Comment: Upper Klamath Outfitters Association (pp. 1 and 2) state that our characterization of the Upper Klamath River in table 3-85, which shows regional whitewater boating opportunities, has some inconsistencies and perhaps inaccuracies. Specifically, we show the Salmon River as receiving a "moderate" level of use and the Upper Klamath River as receiving a "low" level of use. According to the Outfitters' information, the Salmon River receives less than 1,000 user days per year but the Upper Klamath River receives between 4,000 and 6,500 user days. Although they are still waiting for exact use history numbers from the Forest Service, they feel that Upper Klamath River should be reclassified to show a "moderate" level of use. They also say it is incorrect to categorize the Upper Klamath River as having a Boating Class of III –V. All sources of information available to them, as well as their personnel experience, indicates that the Upper Klamath River is Class III-IV+. They also suggest we change the text on page 3-402, line 15, and page 3-403, of the draft EIS, to reflect that at flows over 2,000 cfs, the river offers mostly class IV and IV+ rapids. In addition, the Outfitters state that with a commercial guide present, the Upper Klamath is a great reach for even first time rafters, as long as the rafters are in reasonable physical condition.

Response: As we note in the caption, the primary source for the information presented in this table is PacifiCorp's license application. We have adjusted the table and indicated text to reflect the updated information provided by Upper Klamath Outfitters Association. The updated information does not cause us to change any of our conclusions reached in the draft EIS.

R-3 Comment: PacifiCorp (p. 3-59), commenting on page 3-391, lines 6-19, of the draft EIS, states that our discussion of regional recreational demand for dispersed and developed camping opportunities is not in-depth enough and places too much emphasis on SCORP data. PacifiCorp suggests that this analysis is too broad to be useful in determining what should be provided at specific sites in the project area.
Response: The discussion referenced in this comment is only intended to provide a regional context for recreational resources at the project. The analysis section of the draft EIS provides the rationale for the site-specific recreational improvements.

R-4 Comment: Upper Klamath Outfitters Association (p. 2) comment that our characterization of acceptable and optimal flows for river-based recreation in the project area shown in table 3-86 should be adjusted to show the acceptable range of standard whitewater boating as 1,300 to 3,500 cfs and the optimal range should be 1,500 to 3,200 cfs. They routinely run commercial trips well above the 2,000 cfs listed. During May, June, and July of 2006, many companies ran trips at around 3,200 cfs.

Response: We assume from the context of this comment that Upper Klamath Outfitters Association intended for us to adjust the row in the table that corresponds to "standard commercial rafting," not "standard whitewater boating" as they note in their comment. We adjusted the indicated table accordingly.

R-5 Comment: Oregon Fish & Wildlife comments (p. 214) that section 3.3.6.1.2 on project recreational resources management is confusing and lacks focus. The summary of stakeholder conditions and proposals do little to clarify Commission staff's conclusions and, to the contrary, makes it more difficult to determine what is proposed. In either case, it is not clear how this relates to the staff's conclusions on environmental effects.

Response: Section 3.3.6.1.2 does not include summaries of stakeholder conditions and proposals; however, section 3.3.6.2.1 does include such summaries. In Commission NEPA documents, we attempt to summarize environmental measures from the applicant, agencies, and stakeholders, which may be lengthy and ambiguously worded, to explain our understanding of these recommendations and then provide our analysis of those measures in a subsequent analysis section. Although we may reach conclusions regarding environmental consequences in this section, we make our specific recommendations in section 5.0, *Staff Conclusions*. This approach is consistent with how we structured section 3.2.6.2.1 of the draft EIS. Clarifications to the draft EIS text could be provided if a specific topic or measure were identified but because Oregon Fish & Wildlife was not specific in its comment, no clarification of the text can be provided.

R-6 Comment: On page 3-400, lines 4 and 5, of the draft EIS, we state: "There is not much reported boating use on this reach (referring to the Keno reach), which may relate to access, short run length, and sharp volcanic riverbed rock that is hard on boaters and their equipment." PacifiCorp (p. 3-59) comments that it is unlikely that sharp volcanic rock is the reason for the lack of boating in this reach, unless one is focused on drift boat use only. PacifiCorp concludes that the low demand is more likely because the whitewater is not challenging enough for boaters and is too challenging for most casual anglers.

Response: The text in lines 4 and 5 is based on PacifiCorp's Recreation Resources Final Technical Report, February 2004, pages 4-16, which states, "Very few guidebooks mention this particular run, likely due to difficulty accessing this area, the short length of the run, and the sharp volcanic riverbed rock that is hard on boaters and their equipment." We therefore have not modified the text of our EIS in response to this comment.

R-7 Comment: Interior (pp. 79 and 81), commenting on pages 3-392, lines 25-36, and 3-410, lines 8 and 9, of the draft EIS, states that facilities for RV camping (hook-ups) at J.C. Boyle, Copco and Iron Gate reservoirs are currently lacking. PacifiCorp's draft RRMP should reflect this latent demand (as identified in visitor surveys) and describe opportunities for providing these facilities within the license timeframe. Future demand for these facilities will likely increase.

Response: The text on pages 3-392 and 3-410 of the draft EIS explains the existing conditions in terms of facilities and demand. PacifiCorp has proposed in its current draft RRMP, and we agree, that additional RV facilities should be provided at the project (e.g., 10 of 20 sites at the Boyle Bluffs facility would be designed for RVs). This is consistent with Interior's request for the content of the RRMP.

R-8 Comment: On page 3-400, lines 21 and 22, of the draft EIS, we state: "Under typical peaking operations, the reservoir fluctuates about 3.5 feet, while average daily fluctuations are approximately 1 to 2 feet." Commenting on this, PacifiCorp (p. 3-59) states that J.C. Boyle reservoir fluctuations would likely change substantially under the Bureau of Land Management's once a week peaking release condition. The new flow regime would cause the reservoir to drop 4 or 5 feet each weekend, the highest recreational use period at the reservoir, in contrast to the current 1 to 2-foot average with daily peaking.

Response: The amount that J.C. Boyle reservoir would be drawn down under the Bureau of Land Management's once a week peaking release is a function of the duration of the release and the inflow to the reservoir during each release. The Bureau of Land Management's preliminary and modified 4(e) condition is not specific regarding the duration of the once per week release of flows of at least 1,500 cfs from May 1 through October 31. Obviously, releases of shorter duration would result in smaller drawdowns than releases of longer duration. We interpret the primary purpose of the Bureau of Land Management's measure to provide for at least some whitewater boating opportunities in the peaking reach. Setting the duration of the releases would entail weighing the advantages of an extended duration release with the negative consequences of reservoir drawdowns during the weekend, when most recreational use occurs. We expect that protocols for making these decisions could be incorporated into the project operations management plan that we recommend. We have modified the text of section 3.3.6.2.2, *River Recreation*, to acknowledge the effect that extended weekend peaking reach releases would have on flatwater recreational opportunities at J.C. Boyle reservoir.

R-9 Comment: On page 3-401, lines 34-35, of the draft EIS, we state: "Based on our observations during the site visit, the sidecast material that has reached the bypassed reach channel could form an obstacle for whitewater boaters." PacifiCorp (p. 3-59) confirms that the "sidecast slide" rapid did require portaging for most rafts at flows below about 1,000 cfs (690 cfs for kayaks), but it was runable at 1,300 cfs and higher flows in all craft, based on the results of its boating study.

Response: We substituted the information from PacifiCorp's boating study, cited in the comment, for our original text citing our observations.

R-10 Comment: On page 3-402, lines 6 and 7, of the draft EIS, we state: "This reach (referring to the J.C. Boyle bypassed reach) and the Keno reach are the two most popular angling reaches of the Klamath River between Link River and Iron Gate dams." PacifiCorp (p. 3-59) states that the J.C. Boyle bypassed reach is not more popular for angling than the peaking reach on a per capita basis. Although both the Keno reach and the J.C. Boyle bypassed reach are popular angling reaches, PacifiCorp comments that characterizing them as "the most popular" is misleading.

Response: We revised the sentence to indicate that the Keno, Boyle bypassed, and peaking reaches are all popular for angling.

R-11 Comment: Interior (p. 80), commenting on page 3-402 of the draft EIS, states that recreation in the J.C. Boyle peaking reach is not limited to whitewater boating. PacifiCorp estimated 12,647 annual recreation days, of which 5,252 were commercial boaters. "Some people use the Hell's Corner reach for general riverside recreation rather than for boating or fishing (e.g., walking, hiking, camping, mountain biking, hunting, berry picking). There is access on both sides of the river, several informal trails, as well as some good off-trail hiking along parts of the river. Camping and all-terrain vehicle (ATV) use in the Frain Ranch area appears to be common on summer weekends, and again during the fall hunting season."

Response: We agree that other forms of recreation occur in the peaking reach and adequately explained this on pages 3-401 and 3-402 of the draft EIS, including a description of public access in this area.

R-12 Comment: Interior (p. 80), commenting on page 3-402 of the draft EIS, states that it should be noted that the commercial whitewater boating permittees all run other rivers, and most permittees also provide guided fishing trips.

Response: Our analysis focuses on the effects that would occur at this project in terms of boatable days. We do not consider it necessary or appropriate to characterize the actions or circumstances that do not relate to the project.

R-13 Comment: Interior (p.81), commenting on page 3-409 and 3-410 of the draft EIS, states that although visitor surveys are a good tool to help assess existing recreational needs, visitor surveys should not be the sole tool, since they provide limited information. For example, visitor surveys gather input only from those people who are actually present at the project, performing their activity of choice. The surveys do not assess for potential activities that might attract more recreational users. The Commission's regulations require consideration of both existing and future potential recreational demand (18 C.F.R. §§ 2.7, 4.41). Interior comments that it might be helpful to also refer to state and local comprehensive plans, such as the California and Oregon Statewide Comprehensive Outdoor Recreation Plans (SCORPs), for recreational trends and other high-use recreational activities that are not currently occurring at the project.

Response: We agree that visitor surveys should be used with other information sources, such as SCORPs, that identify recreational trends and latent demand, and the draft EIS does this. We discuss the SCORPs on page 3-391 of the draft EIS and reflect upon these assessments in our analyses of proposed recreational developments. Additionally, our discussion of latent demand on page 3-409 is based on PacifiCorp's recreation report, which draws upon conclusions of the SCORPs.

R-14 Comment: Referring to page 3-410, lines 28-29, of the draft EIS, PacifiCorp (p. 3-60) states that it disagrees with the assumption that algae blooms specifically are the reason why whitewater boaters evaluate water quality as negative. Klamath River water is known for being brown and foamy but these characteristics are largely attributable to the tremendous loading of organic matter from upstream sources.

Response: We deleted the sentence from this EIS suggesting that whitewater boaters may be more affected by water quality than reservoir users, and added brown, foamy water as another potential reason for recreational user negative perceptions (in addition to algae blooms).

R-15 Comment: PacifiCorp (p. 3-60) states that the analysis of latent demand on page 3-409 of the draft EIS lacks specific data of public support for interpretive programs or waterskiing courses.

Response: The information presented on page 3-409 of the draft EIS comes from PacifiCorp's Recreation Resources Final Technical Report, pages 5-48. PacifiCorp's report provides no information regarding public support, or lack thereof, for the two indicated activities. Consequently, we have no basis to modify the text of this EIS in response to this comment.

R-16 Comment: Interior (p. 81) states that there is a clear need for river-based trails, which we do not recommend in the draft EIS. Reservoir-based use and river-based use result in very different experiences. Interior believes a trail along the river would provide access to project waters and help better fulfill the need for trails in the project area. The license also needs to be consistent with the California and Oregon SCORPs. Providing additional river-based trails would be consistent with these plans, which found a high need and demand for these types of trails.
Response: In the draft EIS, we agree that there is a need for trails and conclude that a trail at J.C. Boyle reservoir would be an appropriate recreational measure to include because it would be within the project boundary and provide access to project lands and waters. The recommended trail at Spring Island, however, would not be within the project boundary nor would it provide access to project lands or waters.

We disagree, therefore, with including the proposed Spring Island trail and the Interior-recommended trail from J.C. Boyle to Copco reservoirs because they lack a project nexus.

Recreational Facilities

R-17 Comment: Interior (p. 38) comments that the Link River Trail provides maintenance access for the area downstream of Link River dam. The surrender or decommissioning of East and West Side developments should be conditioned to ensure continued access.

Response: We address the Link River Trail on pages 3-412 and 5-54 of the draft EIS. If these developments were decommissioned, the Commission would not have any jurisdiction over this trail; however, its disposition would be addressed in a decommissioning plan.

R-18 Comment: Interior (p. 81) states that, on page 3-412, lines 33-45, of the draft EIS, we incorrectly identify the Keno Recreation Area located on lands of the United States managed by the Bureau of Land Management. Interior believes this should refer to the lands managed by the Bureau of Reclamation.

Response: Our source document for this statement was PacifiCorp's Road Inventory Maps, which apparently incorrectly identified the managing entity for this land. We modified the indicated text to reflect Interior's comment, which we presume Interior confirmed with Reclamation.

R-19 Comment: Interior (p. 80), commenting on page 3-400 of the draft EIS, states that a new bridge has been completed on Oregon Highway 66 where it crosses J.C Boyle reservoir. The new bridge allows boats to cross underneath, allowing access to both ends of the reservoir. The new bridge has eliminated the Pioneer Park eastside boat ramp. Status of replacement facilities is unknown. The proposed removal of the Keno development from the project and unknown effect on the Keno Recreation Area could shift some recreation demand for boating, day use, and camping to J.C. Boyle reservoir.

Response: We reviewed Pioneer Park on both sides of the newly constructed Highway 66 bridge in November 2006, as well as prior to bridge construction. The boat launch on the east side of Pioneer Park is dirt-surfaced and most suitable for launching car-top boats, although undoubtedly some small trailored boats also were launched at this site. Following construction of the bridge, vehicular access to the east side of Pioneer Park has been accommodated and day-use and car-top boat launching at this location should be able to continue under the term of a new license. We updated our description of the existing Pioneer Park East day-use area in section 3.3.6.1.2, *Project Recreational Resources*, and our analysis in section 3.3.6.2.1, *Recreation Resource Management*, to reflect current conditions and the ability of this site to offer continued access to J.C. Boyle reservoir. We also modified recommendation 20S in the EIS to no longer require coordination with Oregon Department of Transportation regarding retaining the Pioneer Park East as a project feature (such coordination seems to have already occurred) but to include Pioneer Park in the final Recreation Resources Management Plan.

R-20 Comment: Interior (p. 82) comments that the Bureau of Land Management agrees with our analysis on page 3-415, lines 25-30, of the draft EIS, the desirability of continuing to provide recreational access to the east side of the reservoir at the Highway 66 bridge crossing. It suggests that it might be desirable to separate day-use boating and associated activities from other day-use (picnicking).

Response: As we indicate in the previous response, the boat launch at Pioneer Park East has historically been suited for car-top boats, not trailered boats (which are accommodated at Pioneer Park West). We expect such use to continue in the future, and if such is the case, there would not seem to be a need for separating day-use boating activities from other day-use activities any more than currently exists. However, we recommend that PacifiCorp consult with the Bureau of Land Management during

development of the final Recreation Resources Management Plan, at which time consideration could be given by the consulted entities for the need to separate different recreational uses at this relatively small day-use area.

R-21 Comment: PacifiCorp (pp. 2-6 and 3-61), commenting on page 3-415 and our recommendation 20S in the draft EIS, states that it has coordinated extensively with Oregon Department of Transportation during the planning of the new Highway 66 bridge. During the planning stage, it was determined that even a small pull-out/day-use area on the eastern side of the bridge was not feasible due to safety and space constraints. PacifiCorp indicates that when the bridge is completed, this site will be re-evaluated, and if a pull-out day use area can be accommodated, it may preclude the need for the upper Boyle reservoir boating access, since this new area was intended to replace lost capacity from Pioneer Park East.

Response: As we indicate in previous comments, the Highway 66 bridge over J.C. Boyle reservoir is complete. The as-built drawings provided by PacifiCorp to the Commission by letter dated January 30, 2007, show that the approach to the bridge accommodates an access road to Pioneer Park East and Sportsman's Park, and although the parking area at Pioneer Park East is reduced by the new bridge alignment, in our judgment, it is still large enough to support a small day-use area at this location. Because the capacity of this day-use area would be small, we continue to recommend development of the proposed upper J. C. Boyle reservoir boating access area to accommodate expected future recreational demand and compensate for the loss of recreational opportunities associated with the potential removal of the Keno recreation area from the project.

R-22 Comment: PacifiCorp (pp. 2-6, 3-61, and 5-14) essentially agrees with our statements on page 3-415 and the provisions that we recommend in measure 21S and section 5.2.20 of the draft EIS to ensure the entire unit of development of the proposed upper J.C. Boyle reservoir boating access site is included in the project boundary, but comments that operation and maintenance responsibilities for the access road would likely be shared.

Response: Although PacifiCorp would be free to negotiate shared operation and maintenance responsibilities with other entities, if this feature is included in a new license, PacifiCorp would bear ultimate responsibility for operation and maintenance of the access road to this site.

R-23 Comment: Interior (p. 82) comments that the Bureau of Land Management agrees with the draft EIS recommendation to fully develop the Boyle Bluff recreational area within 10 years of license issuance. In addition to providing potable water and a restroom, as we recommend, the need for an on-site host and developed host site at the proposed Boyle Bluff development should be considered. Interior (p. 83), commenting on page 3-424, lines 19-27, of the draft EIS, states that it is unclear if PacifiCorp is planning to provide a seasonal presence for J.C. Boyle reservoir. The Bureau of Land Management believes it would be difficult for a single ranger based in the Iron Gate or Copco area to effectively monitor use at J.C Boyle reservoir, due to the considerable driving time between the areas. The Bureau of Land Management indicates that many of the existing uses in the Boyle Bluff area are problematic, e.g., young adults frequently use the area for partying, jumping off bluffs, late night activities, littering. Having an on-site host would greatly alleviate these concerns and enable quick responses to potential problems. To help in recruiting and to meet the needs of an on-site host, a pressurized water system (versus hand pump well) and an electrical/RV type holding tank hook-up site should be provided at the Boyle Bluff area. These facilities also should be provided at the time of site development, as a delay likely would lead to a continuation of the existing problematic behaviors.

Response: We agree that a host site at the proposed Boyle Bluff recreational area at J.C. Boyle reservoir would be an appropriate measure to include in a project license. This type of on-site management is

consistent with how other recreational developments are managed in the area and it would help alleviate visitors' concerns for safety. We modified our recommendation accordingly.

R-24 Comment: PacifiCorp (pp. 2-4 and 3-61), in response to our analysis on page 3-416 and modification to its recommendation 28P in the draft EIS that would require construction of a potable water supply and rest rooms at the Boyle Bluff recreation area during initial construction, rather than 20 years after license issuance, states that its rationale for this delay was that overnight campers would likely require water to cook and clean, while day use visitors would have less need for water. PacifiCorp acknowledged that including potable water and rest rooms in the initial phase of development would benefit day users and there could be cost efficiencies associated with building all major improvements at once, rather than in two stages. PacifiCorp states that coordination with development of potential potable water supply enhancements at Topsy Campground would be appropriate.

Response: We appreciate PacifiCorp's recognition of our rationale for adjusting the schedule for installing potable water and rest rooms at the Boyle Bluff recreation area.

R-25 Comment: Interior (pp. 82 and 88), commenting on pages 3-415, lines 19-45, and 3-467, lines 25-40, of the draft EIS, states that we do not disclose the effects from development and operation of recreation facilities at the J.C. Boyle development. The EIS should document these effects.

Response: We discuss the effects of recreation site development on wildlife habitat in section 3.3.4.2.2, *Wildlife Resource Management*, *Special Status Wildlife*, pages 3-361, lines 14-24, and 3-362, lines 29-38, of the draft EIS.

R-26 Comment: PacifiCorp (pp. 2-4, 2-5, 3-61, and 5-15) concurs with our analysis on pages 3-416 and 3-417 and our modifications to its proposed J.C. Boyle loop trail provisions, as specified on page 2-46, lines 23-25, and section 5.2.20, of the draft EIS. PacifiCorp notes that the loop trail would generally not provide direct access to Sportsman's Park, but a hardened connection may be appropriate to limit potential environmental impacts and facilitate safe access from Sportsman's Park to project recreational opportunities.

Response: We acknowledge PacifiCorp's concurrence with our analysis of the J.C. Boyle loop trail. A spur trail that provides pedestrian access to Sportsman's Park, although not directly related to the project, would facilitate safe access and minimize potential user-created trails. Development of the spur trail could potentially be pursued if the proposed loop trail cannot be developed because of reasons beyond PacifiCorp's control (e.g., if easements across private property cannot be obtained).

R-27 Comment: Interior (p. 82), commenting on page 3-416, lines 36-47, of the draft EIS, states that it may be desirable to extend the proposed loop trail to the proposed boater access on the upper part of the reservoir, a new project facility. The trail would then provide additional dispersed non-motorized access to opportunities such as fishing and scenery/wildlife viewing with linkage to the proposed boater access.

Response: Although an extension of the loop trail to the proposed boater access site at the upper end of the reservoir may be desirable, we have no information to judge whether there would be potential adverse environmental effects associated with such a trail. PacifiCorp's proposed 5-mile loop trail should meet the need for trails in the vicinity of J.C. Boyle reservoir. Existing, proposed, and recommended recreational enhancements at J.C. Boyle reservoir should provide sufficient opportunities for shoreline angling and wildlife viewing. As we note on page 3-146 of the draft EIS, PacifiCorp's proposed loop trail would require acquisition of easements across private lands. Interior's suggested spur trail might serve as a reasonable option to pursue in the event that PacifiCorp is unable to secure appropriate easements to complete the proposed loop trail. See also our response to the previous comment.

R-28 Comment: Interior (p. 82), commenting on page 3-416, lines 43-45, of the draft EIS, states that Topsy Campground and Topsy Recreation Site are one and the same

Response: We have revised the text in this EIS in light of this information.

R-29 Comment: PacifiCorp (pp. 2-7, 3-61, 5-13, and 5-15), commenting on our analysis on page 3-416, our recommendation 22S regarding development, operation, and maintenance at Topsy Campground, and section 5.2.14, *Recreation Resource Management*, in the draft EIS states that a new Memorandum of Agreement between PacifiCorp and the Bureau of Land Management is appropriate. The agreement would clearly define shared operation and maintenance responsibilities of the two parties, including provision of potable water at this site.

Response: We appreciate PacifiCorp's concurrence with our recommendation 22S in the draft EIS. Any Memorandum of Agreement with the Bureau of Land Management regarding operation and maintenance at Topsy Campground would need to be provided to the Commission. We note that PacifiCorp would bear the ultimate responsibility for this project facility.

R-30 Comment: PacifiCorp (p. 2-1), commenting on our description of measure 37P on page 2-21, lines 38-39, of the draft EIS, clarifies that they propose to provide whitewater boating and river-based fish opportunities at project facilities above J. C. Boyle powerhouse and below the Oregon-California state line. PacifiCorp (p. 5-1), commenting on our description of the same measure on page 5-5, lines 19-20, of the draft EIS, states that we should modify their proposed measure to "… provide whitewater boating and fishing opportunities in the Upper Klamath River/Hell's Corner reach by conducting daily peaking operations at J.C. Boyle powerhouse."

Response: We adjusted the description of this proposed measure in sections 2.2.3 and 5.1.1.1 of this EIS, consistent with PacifiCorp's suggested changes.

R-31 Comment: PacifiCorp (pp. 5-12 and 5-13), commenting on section 5.2.14, *Recreation Resource Management*, of the draft EIS accepts partial responsibility for operation and maintenance of the "old foundations day use area" near J.C. Boyle powerhouse and the Iron Gate Hatchery day use area. However, as is common at other project area recreation sites located on or adjacent to lands managed by other entities, operation and maintenance responsibilities are typically shared with the other entities. Because these sites provide access to non-project-related opportunities, PacifiCorp believes it is appropriate for the other managing agencies to be at least partially responsible for continued operation and maintenance of these sites.

Response: Although PacifiCorp would be free to negotiate shared operation and maintenance responsibilities with other entities, if this site is included in a new license because it provides public access to project lands and waters, PacifiCorp would bear ultimate responsibility for operation and maintenance of the "old foundations day use area" recreation site.

R-32 Comment: On page 3-417, lines 6-8, of the draft EIS, we discuss PacifiCorp's proposals to provide formal access trails to access sites along the J.C. Boyle bypassed reach stating: "Formalizing the existing points of access would minimize the number of user-created routes leading to the river and prevent resource damage such as soil compaction and vegetation damage caused by indiscriminate parking along the roads." Ian Reid (p. 1) supports the creation of a universally accessible fishing platform near the J.C. Boyle powerhouse, but does not agree that an angler trail along the bypassed reach would result in less erosion and soil compaction resulting from user-defined trails. He notes that much of the area is currently too brushy to enable angler access, and creating a trail paralleling the river would result in more use, which would ultimately lead to more user-created trails.

Response: In the absence of identified trails, visitors scout their own routes creating hardened, unvegetated surfaces that are easily eroded when preventative measures such as waterbars are not installed on these trails. There would be less erosion resulting from use of a constructed trail that includes water bars and is sited to avoid sensitive, steep, or other areas prone to erosion. When formalized access routes are not provided, multiple user-created routes usually evolve as visitors attempt to reach water. This circumstance is more likely to create many hardened, unvegetated surfaces that are subject to erosion potential than if designated, properly designed routes were provided and maintained. Based on our observations during the site visit, there currently is evidence of user-created trails in proximity to the J.C. Boyle powerhouse tailrace. This comment does not cause us to change our recommendations. We conclude that information supporting the benefits of formalized access is strong and continue to recommend formalized access routes.

R-33 Comment: Interior (pp. 80, 82, and 83) states that the Spring Island boater access was constructed by the Bureau of Land Management in the early 1980s. The facility was constructed after PacifiCorp prohibited launching from just above the J.C. Boyle powerhouse because of boater safety considerations. Commercial outfitters requested the Bureau of Land Management provide a suitable launch site below the powerhouse. The Spring Island boat launch is accessed by the existing project road. PacifiCorp proposes to include this road as far as the Spring Island turnaround within the new project boundary. The turnaround's primary function is to provide access to Spring Island. PacifiCorp also proposes a small boat and kayak launch facility below J.C. Boyle dam (page 3-418, lines 4-6, of the draft EIS). Although this new facility would likely see use during spring/early summer spill events, Spring Island would continue to be used primarily during summer hydropower peaking events. No other developed whitewater boating facility is available for launches below the J.C. Boyle powerhouse. As a direct result of PacifiCorp operations, and because float boating is directly related to hydropower releases, the Bureau of Land Management believes the Spring Island boater access, including the access road below the turn-around, should be within the project boundary. The Bureau of Land Management requests that we include our rationale for whether Spring Island provides access to project lands, waters, or project-induced recreation in our EIS.

Response: We provided our rationale for why we conclude that Spring Island does not provide public access to project lands and waters on page 3-418, lines 2-7. As previously discussed, our analytical baseline is the project as currently licensed. When the Spring Island access site was constructed during the early 1980s to accommodate commercial outfitters following closure of the site formerly used for access just upstream of the tailrace, the Commission concluded that this new facility should not be included in the project boundary because it did not serve project purposes. We are unaware of new information that would alter this original determination. As we note on page 3-148, lines 4-6, PacifiCorp's proposed angler and boater access sites at the upper and lower ends of the bypassed reach would enable the public to gain access to the peaking reach with kayaks and rafts. From the conceptual designs of the lower bypassed reach access site, its location would be in approximately the same location as the site formerly used for accessing the peaking reach by commercial outfitters prior to the early 1980s. If peaking releases are limited to once a week, as the Bureau of Land Management specifies in its modified 4(e) conditions, we expect use of the peaking reach by commercial outfitters to diminish.

R-34 Comment: The draft EIS, on page 3-418, states: "public access for kayaker and small rafts would be accommodated by PacifiCorp's proposed angler and boater access sites at the upper and lower ends of the bypassed reach. Most commercial rafters would still likely use the Spring Island boater access site." Interior (p. 84) does not believe that access sites at the bypassed reach could be substituted for put-in sites for the peaking reach, largely because flows suitable for whitewater boating are not included in the Staff Alternative for the bypassed reach. If either the Staff Alternative or the Staff Alternative with Mandatory Conditions is licensed, Interior believes that peaking reach access sites would need to be included in the project and improved. Notably, if the availability of whitewater boating opportunities is limited, this

would likely create a large number of users needing to move through the reach in a short window of time. This scenario would require well-designed and well-managed access sites along the river. The scouting trails recommended by Interior would improve the safety of the river users, allowing them to easily scope rapids before running them.

Response: As we note in our response to the previous comment, the bypassed reach take-out site proposed by PacifiCorp and recommended in the Staff Alternative seems to be at approximately the same location as the put-in site used by commercial outfitters prior to the construction of the Spring Island boater access site. PacifiCorp proposes and we recommend enhancements at the State Line Take-out site and additional access sites downstream of this location. If a new license is issued that allows peaking to occur only once a week, we consider it likely that there would be an initial influx of boaters (commercial and otherwise) that seek to take advantage of the remaining limited boating opportunities. However, the peaking reach can only accommodate a limited number of boaters at one time before crowding impairs the experience and creates safety issues. The carrying capacity of the peaking reach itself (not access to the peaking reach) would not appreciably change regardless of having well designed and managed access sites along the river. After an initial surge, we expect boating use to diminish as a result of frustration with the limited and crowded summer boating opportunities that once-per-week peaking would provide. Fees paid by outfitters to the Bureau of Land Management for the privilege of using this reach may soon be deemed questionable business expenses, and, as a result, outfitters likely would reduce their planned trips to the peaking reach. We note that most whitewater boaters on the peaking reach are commercial outfitters, and their guides are typically trained in running the river by experienced guides prior to taking any customers on rafting trips on this reach. Thus, the need for scouting trails or their relation to this project is unclear.

R-35 Comment: Oregon Parks & Rec (pp. 3 and 4) disagrees with our conclusion that the Spring Island trail does not have a direct connection to project lands and waters. It states that our EIS should include an analysis of the environmental effects of the development of the Spring Island trail as an access to the boat launch facility from the overflow parking area and the Staff Alternative should include a development, maintenance, and operation plan and funding for this trail.

Response: We view the "old foundations day use area" proposed by PacifiCorp and included in the Staff Alternative as a support facility (parking, restroom, and picnic tables) for PacifiCorp's proposed angler and boater access sites along the bypassed reach in the vicinity of the J.C. Boyle powerhouse. We acknowledge that its proximity to Reclamation's Spring Island boater access site makes it likely that the old foundations day use area would also serve to accommodate overflow parking in the event that existing parking spaces at Spring Island are no longer available. In that event, user created trails from PacifiCorp's proposed day use area to the Spring Island access site could result in environmental damage. Formalizing a hardened trail could serve to minimize such damage. However, we conclude that the Spring Island boater access site does not serve project purposes because recreational boater access to the upper end of the peaking reach would be appropriate with or without the presence of the project because of the outstanding whitewater boater opportunities provided in the reach when sufficient flows are available. Therefore we do not recommend that PacifiCorp be responsible for constructing and maintaining this 0.25 mile trail. Although we do not include this trail as part of the Staff Alternative, we recognize the Bureau of Land Management's modified 4(e) conditions specify that the Spring Island access site should be included as a project recreational facility in a new license. In that event, PacifiCorp would be responsible for constructing and maintaining this 0.25-mile long trail. We modified the text of sections 2.3.3 and 5.1.1.3, *Staff Alternative with Mandatory Conditions*, accordingly.

R-36 Comment: Interior (p. 81), commenting on page 3-405, line 1-6, states that it is important to note that Spring Island boater access, the Klamath River campground, and dispersed sites located in the Frain Ranch area are all accessed by the project road located within the current project boundary.

Response: Although the road referenced by Interior is in the existing project boundary, as shown in figures 2-3 and 2-5 of the draft EIS, and included in the discussion of access roads on page 3-401, lines 17-27, of the draft EIS, it no longer serves project purposes except the portion that provides access to the J.C. Boyle powerhouse from the northwest. The fact that this road historically also enabled public access to the Spring Island boater access, Klamath River campground, and dispersed sites located in the Frain Ranch area, is not germane to our analysis of whether these recreation sites serve project purposes.

R-37 Comment: Interior (p. 83) does not agree with our conclusion in the draft EIS that Klamath River Campground, Frain Ranch, dispersed sites, and whitewater scouting trails along the peaking reach do not provide access to project lands or waters or accommodate project recreation. As stated in the draft EIS and PacifiCorp's Final Technical Report, there is a clear nexus between whitewater boating and PacifiCorp's peaking operations. Whitewater boaters use all of these sites. Interior does not understand the rationale behind supporting some river access sites (i.e., State-line and fishing access sites 1-6), but not all of the sites. Currently, the Staff Alternative includes sites for fishing and take-out sites for whitewater boaters. However, put-in sites, camping sites, and rest stops along the river are not supported. Therefore, these sites accommodate project-related recreation and should be improved and included in the project boundary. Oregon Parks & Rec (pp. 2, 3, and 4) makes similar arguments for including Frain Ranch and whitewater scouting trails as part of the project. It recommends that we conduct a thorough examination of the environmental and socio-economic effects of the operation and management of Frain Ranch and the associated whitewater scouting trails in the EIS. Our Staff Alternative should include an operation and maintenance plan and funding for the management of Frain Ranch and development and management of whitewater scouting trails. American Whitewater (pp. 6) also concludes that Frain Ranch and other campgrounds south of J.C. Boyle powerhouse are integral to the public enjoyment of the project and the Klamath River, because project operations are affecting demand at these sites and use of these sites fosters use of project-controlled waters and should be included in a new license.

Response: As we indicate in previous comment responses, PacifiCorp's proposed angler and boater access site at the end of the bypassed reach would serve as both a take-out point for boaters on the bypassed reach and a put-in site for boaters using the peaking reach. As indicated by Interior, we include river access points at various locations along the peaking reach from the state line to the confluence with Copco reservoir. Several of these locations represent suitable take-out locations for boaters on the peaking reach. We conclude that these sites provide reasonable public access to project lands and waters. There is no basis to conclude that any license issued for this project include all possible public access sites to project influenced waters, nor is there a basis for including campgrounds in a license just because they are near project facilities. Our conclusions are based on the likelihood that scouting trails, rest stops, and campgrounds near the river would likely exist regardless of the presence of the project. We note that most of the whitewater boating on the peaking reach is conducted by commercial outfitters, and as noted in the following comment, their use of Frain Ranch is infrequent compared to other recreational users. See also our responses to the previous four comments.

R-38 Comment: On page 3-425 of our analysis of recreation sites along the peaking reach we state: "Frain Ranch and Spring Island provide access for primarily commercial whitewater boating outfitters, and consideration could be given to establishing arrangements for the outfitters to take responsibility for a portion of the O&M associated with these facilities." Upper Klamath Outfitters Association (p. 3) state that commercial outfitters currently pay 3 percent of their gross profits on the Upper Klamath River to the Bureau of Land Management. They state that Frain Ranch, which is owned by PacifiCorp, sees more use from off-roaders, campers, and "hunters" than commercial outfitters, mostly due to the poor condition of the access roads. They state that when they use the Frain Ranch area, they practice a "leave no trace" philosophy, leaving the area in better shape than they found it and respecting the historical and cultural aspects of this sensitive area.

Response: We appreciate this additional information provided by the Upper Klamath Outfitters Association and have modified the indicated text accordingly. We also eliminated our original statement describing the basis for this comment because it was intended to suggest actions that could be taken by others outside of this relicensing proceeding and is therefore not relevant to our recommendations in this EIS. Our recommendations have not changed based on this comment.

R-39 Comment: Ian Reid (p. 1) urges against excessive road maintenance in the river corridor below J.C. Boyle dam because it would increase access, visitor use, and compromise the primitive nature and recreational experience in the canyon, although he supports road maintenance to prevent erosion and sedimentation. He also argues against restoring the bridge across the river near Frain Ranch and overdeveloping recreational sites in the vicinity of the J.C. Boyle powerhouse. Similarly, he states that if scouting, angler access, and dispersed access site trails should be developed, they should be for foot traffic only, with enforcement provided to ensure that such trails are not used by off-highway vehicles (OHVs).

Response: We consider the recreational enhancements at J.C. Boyle bypassed and peaking reaches that we recommend in the Staff Alternative to be an effective balance between project-related recreational needs and preserving the natural beauty of these reaches. PacifiCorp does not propose and we do not recommend that the bridge over the peaking reach near Frain Ranch be rebuilt. We do not recommend that PacifiCorp be responsible for developing and maintaining scouting trails along the peaking reach, but such trails are included in the Bureau of Land Management's modified 4(e) conditions. We do recommend development of angler and boater access trails along the bypassed reach and a loop trail at J.C. Boyle reservoir. All of these trails are intended to be for foot traffic only and we would expect the final designs of these trails presented in the Recreation Resources Management Plan to identify means proposed to exclude OHVs.

R-40 Comment: PacifiCorp (pp. 3-60 and 3-61) states that during the ALJ hearings, it argued that with the Bureau of Land Management's once a week peaking releases on a weekends, crowding would be increased at peaking reach put-ins and take-outs. PacifiCorp's design of take-out and angler access from Stateline to Copco reservoir assumed continued usage with daily peaking, not the additional use that would occur if peaking only occurred once a week (which PacifiCorp estimates could double or triple current peak levels). The sites would need to be redesigned to increase the capacity with the Bureau of Land Management's flow regime. PacifiCorp comments that it should not be responsible for managing crowding and congestion impacts induced by a mandatory flow regime.

Response: In table 5-1 (page 5-17) of the draft EIS, we recognize the potential for crowding by recreational boaters seeking access to the peaking reach if peaking events are limited to once a week. Although we cannot predict with certainty how boaters would respond to long-term operation under this operating mode during the boating season, it is entirely possible that after the initial expected surge, the number of whitewater boaters would decrease, as competition for limited space and time on the river diminishes the enjoyment of the experience. Consequently, we consider it premature to consider redesigning boater access sites to accommodate substantially more boaters. However, design of proposed improvements to boater access sites should not preclude potential future expansion of these sites if once a week peaking events increase use.

R-41 Comment: Interior (p. 82), commenting on page 3-417, lines 37-42, of the draft EIS, states that the leaking irrigation canal primarily affects the PacifiCorp portion of Stateline recreation site, and the existing access road is within the proposed project boundary for the take-out. Vehicle access on the road is compromised and resource damage occurs because of the muddy conditions created by the leaking canal. PacifiCorp (p. 3-62) agrees that the irrigation canal should be repaired, but concurs with our analysis in the draft EIS that this repair should not be included as a condition of a new license.

Response: We modified the indicated text to include the new information provided by Interior. This new information establishes a nexus between the leaking irrigation canal and the project access road to the Stateline Take-out recreation site. We recommend inclusion of this site, including the access road, in any new license issued for the project. Consequently, if included in a new license, the Commission would have the authority to order the repair of this canal. We modified our recommendation to add the access road to this recreation site to include provisions for repair of this adjacent irrigation canal, as appropriate. However, if the canal is repaired prior to license issuance, and documentation of the repair is provided, a license article specifying the repair would not be necessary.

R-42 Comment: PacifiCorp (pp. 2-5 and 5-15), commenting on our recommendation on page 2-46, lines 28-30, and section 5.2.20, *Project Boundary Changes*, of the draft EIS, to include the access road from Ager-Beswick Road to the Stateline Take-out in the project boundary, states that the project boundary may be extended as needed to include this site's access road. However, PacifiCorp indicates that they intend to maintain the existing split in maintenance responsibilities and cost-sharing with the Bureau of Land Management.

Response: Although PacifiCorp would be free to negotiate shared operation and maintenance responsibilities with other entities, if this feature is included in a new license, PacifiCorp would bear ultimate responsibility for operation and maintenance of the access road to this recreation site.

R-43 Comment: PacifiCorp (pp. 3-62, 5-12, and 5-13), commenting on page 3-420, lines 12-14, and section 5.2.14, *Recreation Resource Management*, of the draft EIS, affirms that it intends to construct the proposed Fall Creek Trail and because this trail would be within the proposed project boundary, recognizes that PacifiCorp would ultimately be responsible for operation and maintenance of this site. However, because the trail would also provide access to the Cal Fish & Game fish holding facility site, PacifiCorp believes it is appropriate for Cal Fish & Game to be at least partially responsible for continued operation and maintenance of the trail.

Response: Although PacifiCorp would be free to negotiate shared operation and maintenance responsibilities with other entities, if this feature is included in a new license, PacifiCorp would bear ultimate responsibility for operation and maintenance of the Fall Creek Trail.

R-44 Comment: The city of Yreka (p. 4) opposes PacifiCorp's proposed and our recommended enhancements of recreational facilities at the Fall Creek development. With limited signage and an unmarked access road, both city water supply and Cal Fish & Game hatchery facilities routinely suffer from vandalism. The city of Yreka states increased public recreation at this location could result in increased vandalism to the city's facilities.

Response: The potential for vandalism is more related to public road access in this area than to additional recreational development. Because public road access would remain, the potential for vandalism would also continue at this location as well as at every other area accessed by the public road. PacifiCorp's proposed trail development is an important recreational development because non-motorized trail opportunities do not currently exist at the project. Additionally, potential inappropriate activities in this area may diminish in response to providing designated areas for public use and an increased management presence provided in the course of operating and maintaining these facilities.

R-45 Comment: The city of Yreka (pp. 4 and 5) states that its public water supply facilities are subject to vulnerability assessments from state and federal agencies, and increased public recreation in proximity to those facilities would negatively affect those assessments. The city requests that we investigate further the increase in vulnerability to its water supply that increased recreation may present; otherwise the city

may need to explore whether to invoke post 9/11 laws to prohibit public recreational access to the Fall Creek diversion, because the city relies on this exclusively for its domestic water supply.

Response: As indicated in the preceding response, the vulnerability of this facility is directly related to its proximity to a public road, which is not an effect of the project. In addition, there are numerous examples of public recreation facilities located at public water supplies and we do not find this is an extraordinary circumstance. We also note that recreation facilities, including an existing trail leading to the waterfalls, have been provided in this vicinity in the past during which time the city operated its facility without taking any precautionary measures. However, we note that PacifiCorp proposes to fence its facilities in this area and we conclude it would be in the interest of visitor safety and consistent with PacifiCorp's proposed measures to include fencing at the city's facility, and now recommend such fencing in this EIS.

R-46 Comment: The city of Yreka (p. 5) states the existing, unimproved trail at Fall Creek is extremely rocky and very steep, with highly erosive soils. Development of an improved trail is likely to result in continual erosion and increased sedimentation, as well as significant impacts during construction. An increase in recreation visitation could also have a negative effect on the healthy, diverse, and sensitive riparian vegetation along the floodplain of lower Fall Creek. The city of Yreka comments that this location is not suitable for public access or for providing improved recreational facilities.

Response: In many instances, unimproved trails result in considerably more erosion and sedimentation than improved trails because erosion prevention measures can be incorporated into the design of the improved trails. Similarly, many trails are designed to take advantage of streamside riparian habitats and the creation of well-defined trails, with signage at particularly sensitive locations, often prevents or minimizes user-created trails that usually are created when only unimproved, informal trails are available. We do not consider potential erosion or effects on riparian habitat to be a valid reason for not constructing the proposed recreational trail.

R-47 Comment: The city of Yreka (p. 4) states: "If access is further restricted at the Fall Creek watershed, the City formally requests controlled access to the currently locked portions, including Fall Creek Ranch, in order to ensure continued access to our facilities and maintain our monitoring capabilities on the watershed."

Response: We assume this comment pertains to PacifiCorp's proposal to close and restore the existing Fall Creek recreational site on the shore of Iron Gate reservoir, and allow use only for special events. The city maintains a cathodic protection field at this site and its water main crosses under Iron Gate reservoir at this location. Continued access by city personnel would be necessary for monitoring and maintenance purposes and we expect PacifiCorp to accommodate this access. Accordingly, we will add the city of Yreka to the consulted entities during the finalization of the Recreation Resource Management Plan, to ensure that provisions for access at this site, as well as other concerns regarding public use at recreational facilities at the Fall Creek development, are appropriately addressed.

Recreation Management- Programmatic Elements

R-48 Comment: Page 3-424, footnote 108,of the draft EIS indicates that PacifiCorp would coordinate its patrols with the Bureau of Land Management and Klamath County law enforcement patrols of J.C. Boyle reservoir and J.C. Boyle bypassed reach. Interior (p. 83) states that the Bureau of Land Management believes it would be difficult for PacifiCorp to provide adequate seasonal presence for the area with the existing limited Bureau of Land Management and county law enforcement resources. The proposed PacifiCorp recreation developments (not including Topsy Campground) may significantly increase use of the area and associated potential for use conflicts. PacifiCorp seeks to contract with

Siskiyou County for law enforcement patrols. The Bureau of Land Management believes PacifiCorp should pursue a contract with Klamath County and/or provide a dedicated seasonal presence for the J.C. Boyle reservoir and J.C. Boyle bypassed reach.

Response: We modified our recommendation in the Staff Alternative to provide for a seasonal host site during the initial phase of development of the proposed Boyle Bluffs recreation area at the J.C. Boyle reservoir rather than during the subsequent proposed expansion of the site to accommodate RVs. Such a presence should serve as a deterrent to inappropriate behavior.

R-49 Comment: PacifiCorp (pp. 2-4, 3-62, and 5-13), commenting on our analysis on page 3-425 and recommendation in the draft EIS to address recreational facility replacement in the final Recreation Resource Management Plan, states that recreation site facility replacement is included in the routine site operation and maintenance costs outlined in the plan and should be clarified in the next version of the plan. PacifiCorp will verify its proposed estimated operation and maintenance budgets to ensure that appropriate facility replacement costs have been included. PacifiCorp states that facility replacement needs to be clearly differentiated from capital development and site enhancement projects.

Response: We modified our description of PacifiCorp's proposed measure in section 3.3.6.2.1, *Recreation Resource Management*, as well as sections 2.2.3, *Proposed Environmental Measures*, and 5.1.1.2, *Staff Alternative*, to reflect PacifiCorp's statement that its proposed O&M program would account for facility replacement, as needed. Our revised costs in this EIS reflect this clarification of PacifiCorp's proposed O&M program for recreational facilities.

R-50 Comment: PacifiCorp (p. 3-62), commenting on our discussion of the operation and maintenance appendix of the draft Recreation Resource Management Plan on page 3-425, lines 16-21, of the draft EIS, states that Recreation Work Group participants, including neighboring agencies, were invited to develop and comment on the draft Recreation Resource Management Plan, including this appendix, and members of this group would continue to be involved in the development of the final Recreation Resource Management Plan. All consultation with Recreation Work Group participants would be adequately documented and included in the final Recreation Resource Management Plan.

Response: We added the indicated information regarding PacifiCorp's proposed consultation during development of the Recreation Resources Management Plan to section 3.3.6.2.1, *Recreation Resource Management*, of this EIS.

R-51 Comment: PacifiCorp (p. 3-60), commenting on page 3-411, lines 19-35, of the draft EIS, states that for the final Recreation Resource Management Plan, PacifiCorp plans for continued consultation and cooperation with the Recreation Work Group (as they discuss in section 3.1 of the draft Recreation Resource Management Plan).

Response: We added the indicated information regarding PacifiCorp's proposed consultation during development of the final Recreation Resources Management Plan to section 3.3.6.2.1, *Recreation Resource Management*, of this EIS. However, we note that section 3.1 of the draft RRMP pertains to consultation with the Recreation Work Group once the plan is finalized, not consultation during the finalization of the plan. We expect such consultation to occur during finalization of the plan, as well, and to avoid any ambiguity regarding the consulted entities in the finalization of the Recreation Resources Management Plan, we now list them in section 5.1.1.1, *Staff Alternative*, of this EIS.

R-52 Comment: PacifiCorp (p. 3-60), commenting on page 3-411, lines 33-41, of the draft EIS, agrees with our suggestion that Oregon Fish & Wildlife and tribal representatives should be afforded advisory roles in the finalization and implementation of the Recreation Resource Management Plan.

Response: We added the indicated information regarding PacifiCorp's proposed consultation with Oregon Fish & Wildlife and tribal representatives during development and implementation of the final Recreation Resources Management Plan to section 3.3.6.2.1, *Recreation Resource Management*, of this EIS. This represents a modification of PacifiCorp's original proposed measure. Also, see our response to the previous comment.

R-53 Comment: PacifiCorp (pp. 2-7 and 3-63), commenting on our analysis on page 3-425 and our recommendation 23S in the draft EIS to develop an off-highway vehicle management plan as a component of the final Recreation Resources Management Plan, states that any such management must be project specific and relate to project lands. PacifiCorp notes that it has already proposed several measures to protect sensitive environmental resources from off-highway vehicle use in the project area and it is appropriate to clearly define and manage off-highway vehicle use restrictions in both the final Recreation Resources Management Plan and the final Road Management Plan.

Response: We appreciated PacifiCorp's concurrence with the need for our recommendation 23S. We recognize that PacifiCorp has already proposed several measures to protect sensitive resources from off-highway vehicles. We also acknowledge that off-highway vehicle management included in the final Recreation Resources Management Plan and final Road Management Plan would need to have a nexus to project purposes.

R-54 Comment: PacifiCorp (p. 3-63), commenting on our discussion of recreational planning horizons on page 3-427, lines 14-25, of the draft EIS, believes that 3 years is an adequate period of time to plan for short-term recreation-related projects. The 5-year action plan complements the more long-term planning aspects of the Recreation Resource Management Plan. In addition, PacifiCorp intends to review and potentially revise the Recreation Resource Management Plan on a 6- and 12-year basis, in consultation with the Recreation Work Group. Major construction projects are already phased in 10-year periods in the existing Recreation Resource Management Plan. For these reasons, PacifiCorp believes the planning horizon of the proposed rolling 5-year action plan is appropriate.

Response: The reason we consider a 10-year planning horizon to be appropriate is stated in the indicated analysis text of the draft EIS. If agencies are not afforded sufficient time to secure funding for capital improvements that are proposed for cooperative funding, the Commission would likely still require PacifiCorp to implement such improvements if they are consistent with the conditions of a new license regardless of whether PacifiCorp is able to negotiate cooperative funding agreements with the agencies. However, we do not make a specific recommendation in either the draft EIS or this EIS that a 10-year planning horizon be included in the final Recreation Resource Management Plan because PacifiCorp would ultimately be responsible for funding any recreational facilities, including proper O&M, regardless of any cooperative funding agreement.

River Recreation

R-55 Comment: Footnote "a" of table 3-86 in the draft EIS notes that PacifiCorp's license application presents an optimal range of flows that is not within the acceptable range of flows. PacifiCorp (p. 3-59) concurs that this was an error in the license application and we show the correct value (1,500 rather than 150 cfs) for the high end of acceptable fishing in the Link River bypassed reach.

Response: We deleted the footnote in response to this comment.

R-56 Comment: Footnote "d" of table 3-86 in the draft EIS states that the acceptable and optimal range of flows in the J.C. Boyle bypassed reach were measured as releases from J.C. Boyle dam, and does not

include any accretion flow. PacifiCorp (p. 3-59) states that accretion flows (about 220 cfs) are considered in the bypassed reach flow ranges.

Response: We corrected the text to indicate that the range of flows includes the accretion flows that begin to enter the reach about 0.5 mile below the dam.

R-57 Comment: Interior (p. 79) comments that, for the J.C. Boyle bypassed reach, the Staff Alternative flow recommendation (200 cfs dam release) is at the low end of the acceptable range for angling, and PacifiCorp's proposed dam release of 100 cfs is below the acceptable range, according to table 3-86 of the draft EIS. Interior states both PacifiCorp's proposed release of 100 cfs (current) and the staff-recommended flow of 200 cfs are outside the suggested optimal range for fishing (300 to 400 cfs). The EIS should recognize that the Bureau of Land Management prescribed flow release of 470 cfs is only slightly above the optimal range and is in the middle of the acceptable range.

Response: In the text, we acknowledge the sensitivity of this analysis to the selected range of flows, which is why we based our analysis on the acceptable rather than optimal range of flows. We analyzed a range of flows to allow for variability within the angling population.

R-58 Comment: Interior (p. 85) states that our analysis of whitewater boating opportunities on pages 3-428 through 3-446 should include the ALJ decision results, including several critical findings regarding whitewater rafting and the benefits of instream flows in meeting multiple resource management objectives.

Response: Many of the findings from the ALJ decision are consistent with our description of the affected environment and analysis. However, where this information provides clarity or consistency, we included it in the revised text of this EIS.

R-59 Comment: Interior (p. 85) recommends that our analysis of whitewater boating opportunities for the J.C. Boyle bypassed reach be expanded to include opportunities for rafting as well and recognize that this bypassed reach provides a high-quality experience when flows are available. The Commission has consistently required recreational boating flows in bypassed reaches when project operations would continue to impact whitewater boating opportunities (see for example projects in Bear River, Idaho, Clackamas River, Oregon, and the North Fork of the Feather River, California). This is clearly the case in the Klamath Basin bypassed reach. Interior recommends Commission staff reconsider its analysis and refer to past precedent for providing these flows. Josh Strange (pp. 7 and 8) comments that the J.C. Boyle bypassed reach offered better expert whitewater than the peaking reach and concludes that recreational flow releases during the summer should be provided on a limited, but regular basis (he suggests once a week), as long as the needs of fish and other aquatic resources are met. Also, American Whitewater (p. 9) states that seasonal high flow releases to the J.C. Boyle bypassed reach, if predictable, would provide a potential valuable recreational opportunity for whitewater boaters and sees no reason why such recreationally and ecologically valuable flows should be ignored. It states that such flows should be included in the Staff Alternative.

Response: Our basis for not including seasonal high flow releases in the draft EIS Staff Alternative was based on our conclusion that the environmental benefits were not worth the expected cost associated with a week of lost generation that such flows would entail. Based on clarifications provided in response to our draft EIS, we now recognize that the seasonal high flow releases would only occur in about half the years and it may be feasible to schedule annual maintenance outages during any such seasonal high flow events. Consequently, we now include seasonal high flow releases in the Staff Alternative. We expect the public to be notified of such seasonal high flow events via the Internet web site that we also recommend. In addition, if annual maintenance outages at J.C. Boyle or Copco No. 2 developments are

planned, we expect such outages to be posted on the web site to enable whitewater boaters to plan potential trips to these bypassed reaches.

R-60 Comment: Interior (p. 85) notes that on page 3-432, lines 15-16, of the draft EIS, we make the assumption that PacifiCorp would release an extra 100 cfs from the dam rather than the powerhouse. Interior states that since PacifiCorp did not specify which location the 100 cfs would be released, the impacts of both these alternatives should be examined. Interior comments that acceptable angling (as defined in table 3-86) would be eliminated in the bypassed reach under PacifiCorp's proposed flow if the additional flow was released at the powerhouse and only 100 cfs released at the dam, because flows would be less than the minimum 200 cfs in the acceptable range.

Response: If PacifiCorp's proposed release of 100 cfs is made at the powerhouse, recreation conditions in the bypassed reach would be as they are under current conditions. Consequently, the effects on recreation conditions in the bypassed reach of relicensing an extra 100 cfs from the powerhouse instead of the dam are described in the affected environment section on pages 3-401 and 3-402 of the draft EIS. As we note in table 3-86, the low end of acceptable angling flows in the bypassed reach is 200 cfs. Consequently, flows under existing conditions would generally be unacceptable for angling except during periods of spillage, as Interior notes. However, the groundwater springs add about 225 cfs starting about 0.5 mile below the dam; therefore, flows above the low end of acceptable angling would occur in the majority of the bypassed reach.

R-61 Comment: Interior (p. 85) comments that our use of "optimal" and "acceptable" flow ranges on pages 3-432 through 3-435 in the draft EIS is very arbitrary and does not adequately describe the fishing experience for the respective river reaches. It notes a more accurate and appropriate analysis procedure for determining impacts of the various flow alternatives to fishing would be to develop equations based on the fishability curves provided in the Recreation Resources Technical Report (PacifiCorp, 2006). These equations could be applied to alternative flow regimes to generate numeric values for "fishability" based on the proportion of daylight hours at various flow levels. It would then be possible to quantitatively compare the impact of various flow alternatives.

Response: The term "arbitrary" implies there is no basis for determining the range of flows used in the analysis, when, in fact, the range of flows used in the analysis is based on PacifiCorp's recreation study results. Additionally, the study was designed in collaboration with the stakeholders and the approach, using a range of flows that we presume were defined during the study design. This detailed level of hourly analysis is unnecessary especially considering the data are based on four interviews with local, experienced anglers (Phase I) and on-site reconnaissance (Phase II).

R-62 Comment: PacifiCorp (p. 3-63), commenting on our discussion of recreational flows in the J.C. Boyle bypassed reach on page 3-432, lines 8-27, of the draft EIS, states that we use the "acceptable" range of fishability of 200 to 1,000 cfs for our analysis. PacifiCorp prefers the use of more precise ranges of flows for its assessments, which are 350 to 700 cfs (preferred), 700 to 1,400 cfs (diminished), and over 1,400 cfs (high flow fishing only). PacifiCorp does not, however, find that these more precise flow ranges would fundamentally change the conclusions of our analysis.

Response: Our analysis is consistent with table 2.7-9 in PacifiCorp's Recreation Resources Final Technical Report (PacifiCorp, 2004c), which provides the range of acceptable and optimal flows for angling.

R-63 Comment: On page 3-432, lines 16-19, of the draft EIS, we state: "Figures 3-89, 3-90, and 3-91 show that almost all angling opportunities in the optimal range of flows would be eliminated under the Oregon Fish & Wildlife and Bureau of Land Management flow measures and dam removal, but

PacifiCorp's proposal would opportunities during every month of every water year type." Interior (p. 86) notes that our conclusion contradicts data in table 3-86. Also, the Bureau of Land Management's analysis of the flow record (attached to its comments) indicates that flow releases of about 400 cfs or less from the dam would be common in dry years under the Bureau of Land Management's flow prescription.

Response: We agree that flow releases from the dam of 400 cfs or less would be relatively common in dry years under the Bureau of Land Management's and Oregon Fish & Wildlife's recommended measures. However, inflow from the groundwater springs, which adds a relatively consistent 220 cfs or more, starts about 0.5 mile downstream of the dam in the bypassed reach. The addition of the spring inflow results in flows in excess 400 cfs, the upper range for optimal angling, in the majority of the bypassed reach. However, flows within the acceptable range for angling would be common in the bypassed reach during most water years with the Bureau of Land Management flow prescription.

R-64 Comment: Interior's (pp. 79 and 86) interpretation of table 3-86 suggests that optimal fishing flows (300 to 400 cfs) would be eliminated during all times except when spill is occurring since flows recommended by the Commission (200 cfs) and proposed by PacifiCorp (either 100 or 200 cfs) are below the optimal range. Interior comments this is contrary to what is described in figures 3-89 through 3-91, which show the number of days with optimum flows under the existing and alternative conditions.

Response: In the draft EIS, figures 3-89 through 3-91(Existing Flows and PacifiCorp Proposal), show conditions in the bypassed reach as the result of 100 cfs released from the dam, 100 cfs from the powerhouse, and the inclusion of 220 cfs from the groundwater springs. However, in this EIS, we revised these figures to show conditions as the result of the minimum flow of 200 cfs released from the dam, which result in excess of 400 cfs in the majority of the bypassed reach.

R-65 Comment: Interior (p. 81), commenting on page 3-403, lines 26-27, of the draft EIS, states that the Bureau of Land Management concurs that 1,500 cfs is an optimal whitewater boating flow, but it is not the minimum and requests that we correct the EIS accordingly.

Response: The text is based on information reported in the Recreation Resources Final Technical Report, page 2-77, which states, "The Oregon Water Resources Department conducted a Scenic Waterway Recreation analysis for the Upper Klamath in 1990, part of the proposed Salt Caves Hydroelectric Project proposals and subsequent studies (OPRD, 1990). The study included an assessment for recreation stream flow, the fundamental task in this [Final Technical Report]. In general, however, its primary sources were other reports and letters from the Bureau of Land Management and six rafting outfitters. This document notes that 280 cfs is necessary to run rafts from Upper Klamath River (Spring Island) Boater Access to the top of the gorge (based on City of Klamath Falls Salt Caves FERC application, 1986), and that 1,500 cfs is the minimum raftable flow for the reach in general (OPRD, 1990, quoting a 1989 Bureau of Land Management letter)." We modified the text to explain the source of this information.

R-66 Comment: On page 3-403, lines 8-9, of the draft EIS, we state: "Very few commercial rafting trips occur when both generators are operating because of safety concerns." PacifiCorp (p. 3-60) comments that two-turbine flows are not inherently more dangerous than other flows because, although two-turbine flows are more challenging in terms of hydraulics, the consequences of having swimmers may actually decrease because there are fewer rocks to hit. PacifiCorp further notes that commercial rafting companies do not avoid trips at two-generator flows; in fact several companies prefer them and advertise their challenging aspects.

Response: This information is based on a comment letter submitted by Noah Hague, owner and operator of Noah's River Adventures, dated April 26, 2004, which states: "The danger and risk factor is too high for commercial boating above 3,000 cfs." Subsequent comments from PacifiCorp and the Upper Klamath

Outfitters Association on the draft EIS dispute this characterization. They state that commercial trips do not typically occur during two-turbine releases because such releases do not occur during the summer months when most of the commercial boating takes place and not because such flows are risky or dangerous. We revised this EIS to include this information.

R-67 Comment: Interior (pp. 81 and 86), commenting on page 3-403, lines 29-30, of the draft EIS, states that a 4-hour launch window is desirable and provides adequate time for completing a whitewater boating trip. However, a smaller window of 1 to 2 hours, as was the case during drought conditions in the early 1990s, allows sufficient time for a safe float trip, as long as boaters are aware of the narrow float window.

Response: To address this comment, we include text in this EIS regarding a shorter launch window.

R-68 Comment: PacifiCorp (p. 3-60), referring to page 3-403 of the draft EIS, states that a 4-hour window may not be long enough if boatable flows occur only 1 or 2 days per week, as would be the case with the Bureau of Land Management flow regime.

Response: We agree that a longer launch window may be necessary to provide access at the put-in and to avoid congestion at key rapids if the existing level of use must be accommodated over fewer days. We include this potential effect in our analysis of the Bureau of Land Management 4(e) condition in this EIS.

R-69 Comment: Interior (p. 86), commenting on page 3-437, lines 16-19, of the draft EIS, states that we used a 5-hour launch window as one of the factors for our analysis of whitewater boating opportunities. Although 5 hours is a desirable launch window, as it provides opportunities for boaters to launch at times when there are less crowded conditions, a more realistic acceptable launch window would be 4 hours. The important point for floating is to be sure to "catch the wave" of released water, which enables companies to complete a float trip with flow of about 1,500 cfs, even after ramping down has occurred at the J.C. Boyle powerhouse. The Bureau of Land Management used a minimum 4-hour peak flow for modeling its mandatory flow conditions to determine boatable days, and Interior states that we should also use this window during our EIS analysis.

Response: We used a 5-hour launch window to ensure we would not overestimate the number of boatable days. However, to be consistent with existing operating conventions, assumptions used in the Bureau of Land Management Flow Management Scenario model, and to respond to the comments received, we modified our analysis to include a 4-hour launch window, instead of our original 5-hour launch window.

R-70 Comment: The draft EIS on page 3-429, lines 21-23, states: "The Bureau of Land Management specifies that PacifiCorp operate the project between May 1 and October 31 to provide flows between 1,500 to 3,000 cfs a maximum of once a week in the J.C. Boyle peaking reach." Interior (pp. 65 and 86) and PacifiCorp (p. 2-8) comment that, although this event would be once a week, it would not necessarily be a 1-day event, as we state on page xxx, line 4, and suggest on pages 3-429, line 24, and 3-438, line 11, of the draft EIS. If sufficient water is available, this higher flow would be sustained for more than 1 day, allowing additional float boating opportunities. Interior requests that we correct the EIS to reflect the potential for the flow events to last more than 1 day.

Response: We adjusted the referenced text in this EIS to reflect the possibility that peaking releases could last for more than 1 day during a week. Our flow modeling conducted for the draft EIS, which assumed a drawdown of J.C. Boyle reservoir of up to 4 feet during the weekend, shows that, during below average years, the weekly peaking event with releases of between 1,500 and 2,000 cfs would only last for a day (resulting in the 4 days per month shown in figure 3-98 of the draft EIS). Flows during an average

water year would be sufficient to sustain a peaking release of between 1,500 and 2,000 cfs for 2 days a week during May and the first 2 weeks of June (which results in the 8 and 6 days per month, respectively, of optimal boating flows shown in figure 3-99 in the draft EIS). In an above average water year, as figure 3-100 shows, peaking lasting 2 days per week or more could likely occur under the Bureau of Land Management flow regime during May, June, September, and October, but more limited peaking would typically occur during July and August, averaging 1.5 days per week per month.

R-71 Comment: Interior (p. 36) notes that both the angling and whitewater boating opportunities analysis in section 3 of the draft EIS relied on several inappropriate assumptions. Our assumption that, under the Bureau of Land Management flow regime, at the J.C. Boyle development boating flows would only be provided 1 day per week likely overestimated boating opportunities in extremely dry years and severely underestimated opportunities for average and wet years. Interior comments that a more accurate model for estimating impacts of various flow scenarios (the Bureau of Land Management Flow Management Scenario model) was submitted to the Commission in March 2006. Interior states that this model, as amended and improved during the EPAct proceeding, should be used to revise the draft EIS analysis of whitewater boating impacts. During the EPAct proceeding, PacifiCorp and the Bureau of Land Management agreed on a set of model outputs for describing boating impacts for three representative water years (Turaski Ex 5, page 1).

Response: We recognize that there are alternative approaches that can be taken to modeling and analyzing the number of boatable days in the peaking reach. As pointed out by the ALJ in the EPAct hearings, the PacifiCorp and Flow Management Scenario models are approximations of what impacts might actually occur on whitewater boating opportunities. However, in the interest of accommodating other approaches to this analysis, we included the analysis of boating days using both our model as well as the Bureau of Land Management's model. We revised the text to include both analyses and note that fewer boatable days are predicted to occur under the Bureau of Land Management 4(e) condition using our model in part because it considers project operational constraints that are not considered in the Flow Management Scenario model.

R-72 Comment: Upper Klamath Outfitters Association (p. 3) agrees with most of our conclusions on pages 3-437 through 3-443 of the draft EIS. However, it would like to see the optimal range of flows for commercial rafting used in our analysis raised to 3,200 cfs, rather than the 2,000 cfs that we used for the peaking reach. Its states that use of the lower range makes figure 3-100 in the draft EIS especially misleading because 2006 was an above average water year type and the outfitters experienced far more boatable days than are shown in figure 3-100. The Outfitters also do not find that there would be any water year type where the Bureau of Land Management specified peaking reach flow regime would allow for more boatable days than are currently available.

Response: We modified the range to analyze boatable flows up to 3,500 cfs.

R-73 Comment: PacifiCorp (p. 3-63), commenting on pages 3-437, lines 22-25, and 3-438, lines 1-6, of the draft EIS, states that the EPAct proceeding clarified the likely loss of days of boating in the peaking reach under the Bureau of Land Management flow regime. PacifiCorp suggests that we use these facts in our analysis, which focused on the loss of boating in the months of July and August. PacifiCorp agrees with our approach to compare days of opportunities rather than days of actual use.

Response: The Bureau of Land Management has since modified its condition. We revised our analysis to disclose the effects of the Bureau of Land Management's modified 4(e) condition by month to capture the effects that would occur during the recreationally important months of July and August.

R-74 Comment: Interior (p. 86), commenting on page 3-438, lines 33-44, of the draft EIS, states that it is inappropriate to characterize the various flows to represent "angling opportunities." The study upon which the attributes were developed only measured respondents' impressions of shore based "wadability" at various flows, not "fishing opportunities." Oregon Fish & Wildlife (pp. 214 and 220) states that the draft EIS conclusions regarding angling are based on a study for wadability of the river and not its productivity for fish, invalidating the study conclusions. Recent information obtained from Oregon State Police also contradicts the Commission's conclusions on angler satisfaction with the J.C. Boyle peaking and bypassed reaches. Interior (p. 36) and Oregon Fish & Wildlife (p. 216) also comment that the draft EIS failed to conduct an adequate analysis of the impacts on fishing opportunities by basing its conclusions on an extremely narrow interpretation of the effects of flow on fishing opportunities. They suggest revising the draft EIS to correct for these deficiencies and fully disclose the breadth of impacts and correlated benefits resulting from the various flow prescriptions. Interior (pp. 86 and 87) and Oregon Fish & Wildlife (p. 220) further comment that our discussion of impacts on fishing should consider the findings and recommendations contained in *Flows and Recreation: A Guide to Studies for River Professionals* (Whittaker et al., 2005). To assess angler preferences, biophysical scientists need to specify how the flow regimes affect the fishery and social scientists need to develop data from anglers to consider the trade-offs." They state that PacifiCorp's recreation study evaluated only the question of wading based opportunities with respect to flow levels.

Response: We note the important distinction between wadability and fishing opportunities at the beginning of our analysis on page 3-430 of the draft EIS. We further clarified this distinction by modifying the text of this EIS and also directing the reader to section 3.3.3.2.5, *Anadromous Fish Restoration*.

R-75 Comment: Interior (p. 86) states we should recognize that the Bureau of Land Management flow condition would provide flows close to optimal most days and that there would be a benefit to anglers if these flows resulted in improvements in the fish population, such as higher fish density or larger fish. Oregon Fish & Wildlife (p. 223) state that the substantially higher minimum flows and reduced ramp rates proposed by state and federal agencies would provide a far more productive fishery with much more opportunity to support the Outstandingly Remarkable Value of fisheries. The existing operations, PacifiCorp's proposed project, and the Staff Alternative perpetuate unhealthy, unproductive native rainbow trout populations with low catch rates except for the morning or evening hour prior to or after peaking, and limited access for the angling community to participate.

Response: Our analysis indicates the Bureau of Land Management's 4(e) condition would not provide optimal angling flows on most days because the minimum flow requirement combined with accretion flows would cause flows to be higher than 500 cfs which is the upper limit of the optimal range of flows for angling. Our analysis shows that under the Bureau of Land Management's specified flow regime the only time optimal angling conditions would occur in the peaking reach would be for about 3 days during July of a below average water year. Our analysis of the acceptable range of angling flows indicates very little difference between all of the measures showing almost daily opportunities would exist from June through October. Our analysis of the habitat versus flow relationship for adult and juvenile redband/rainbow trout indicates a peak in the 400 to 600 cfs range before declining with higher flows. Updated information from 2004 provided by Cal Fish & Game, during the EPAct 2005 proceedings, indicates that the peaking reach has the highest catch rate among 34 streams surveyed. Overall, the available information indicates that the redband/rainbow trout population on the river reach is highly productive and we expect that this fishery would be sustained and improved under the PacifiCorp Proposal, the Staff Alternative and the Staff Alternative with Mandatory Conditions. It is not unexpected that anglers experience low catch rates for trout during mid-day compared to morning or evening. Such catch patterns are common in regulated and unregulated streams, and anglers frequently schedule trips to

take advantage of these patterns. We do not agree that there are or would be undue limitations to the angling community.

R-76 Comment: Interior (p. 87) and Oregon Fish & Wildlife (pp. 220 and 221), commenting on page 3-438, lines 33-37, of the draft EIS, state that if fishability is going to be evaluated with respect to flows, we should use an hourly timescale rather than the daily minimum flow. This would provide a more realistic impact analysis with respect to the limited daylight hours of wadeable flows under various proposed regimes. During the spring and fall months and in wet years, peaking operations often begin before daylight and end after dark. This factor should be evaluated with respect to the various flow alternatives. Cal Fish & Game (p. 14) notes that there is an inherent bias and circular logic in measuring of "fishability" as rated by local anglers. Any change from the status quo would shift angling conditions outside the range that is familiar and comfortable to participants, and the results of PacifiCorp's angling studies should consider this bias. Cal Fish & Game believes that anglers eventually would adapt to a new flow regime but acknowledge it would take time to develop new techniques and strategies. Oregon Fish & Wildlife (pp. 221 and 222) comments that the draft EIS adopted PacifiCorp's erroneous comparison of the catch rate while the turbines are turned off, to other productive rivers with high catch rates. The draft EIS should have pointed out that a major impact of the hydroelectric facility is that catch rates approach zero during ramping and peaking flows and PacifiCorp only recorded the maximum catch rate during the low flow period. As noted in its response to the REA notice, only 180 hours of angling per year are available per year in the peaking reach. In contrast, 3,240 hours of angling are available per year for the Keno reach, an 18-fold increase in angling, despite a 3 ½ month fishery closure.

Response: Angling opportunities were analyzed on a daily basis rather than hourly basis because most anglers prefer to fish in the morning and evening to coincide with fish feeding patterns, as we note in the previous response. Because these are the critical time periods for angling, it is appropriate to consider a day of angling opportunity would be provided if suitable flows were present during these critical hours. An hourly analysis would be misleading because if suitable flows were provided during mid-day, when anglers typically do not fish because the fish are not as actively feeding, it would be inappropriate to conclude that there was an angling opportunity provided. A daily analysis also is consistent with Cal Fish & Game's statement that anglers would eventually adapt to a new flow regime but acknowledge it would take time to develop new techniques and strategies. Under current peaking conditions, good wading conditions are supported for several hours on most days, which are ideal for less skilled anglers. We acknowledge that in rivers with constant flows throughout the day, the angling experience is different, but general comparisons of catch rates on a daily basis provide useful information to the reader.

R-77 Comment: Oregon Fish & Wildlife (p. 223) comments that the draft EIS failed to note that catch rates by anglers for the period 1953-1958, prior to when J.C. Boyle dam was completed, had substantially higher catch rates, ranging from 0.58 to 1.44 fish/hour with a mean of 0.79 fish/hour. The pre-dam angling catch rate was substantially higher than the post-dam angling catch rate in the J.C. Boyle bypassed reach and even slightly higher than the catch rates in the peaking reach when flows are reduced and fish are concentrated and easy to catch due to the low flow.

Response: Our baseline for the project analysis is the existing conditions. The Commission does not analyze pre-project conditions to determine the effects of the project.

R-78 Comment: Interior (p. 87) and Oregon Fish & Wildlife (pp. 223-226) comment that our analysis of angling in the peaking reach should include consideration of the written testimony of Don Denman provided during ALJ hearings. His testimony speaks to his recollection that the trout fishing experience in the peaking reach was outstanding before the J.C. Boyle development began manipulating flow levels. Trout over 20 inches were common and trout spawning was observed in the Frain Ranch area of the peaking reach.

Response: Our baseline for the project analysis is the existing conditions. The Commission does not analyze pre-project conditions to determine the effects of the project.

R-79 Comment: PacifiCorp (p. 3-60), commenting on page 3-406, lines 9-12, of the draft EIS, states that the Copco No. 2 bypassed reach has high-quality rapids and scenery, but it is short and boating requires flows in excess of 200 cfs in kayaks and 600 cfs for standard boating. With the agency-recommended flows to this bypassed reach, boating would be possible on numerous days, although access improvements and other management activities would be needed.

Response: We modified the text in this EIS to reflect this characterization of the Copco No. 2 bypassed reach. We recognize that the agencies' recommended minimum flows of 730 cfs would increase boating opportunities in the Copco No. 2 bypassed reach, but access improvements would be needed to facilitate enhanced whitewater boater use of this reach. However, required minimum flows of 730 cfs are not included in any of the action alternatives that we include in this EIS.

R-80 Comment: NMFS (p. 62), Interior (p. 86), and Oregon Fish & Wildlife (p. 220) state that section 3.3.6, *Recreational Resources*, should have a discussion on the impacts of anadromous fish reintroduction on the recreational fishery. Oregon Parks & Rec (p.1) states that when anadromous runs are able to connect to their historic habitat, life cycles and survivability would improve and a new fishery would be offered in the upper basin.

Response: On page 3-448, lines 12-15, of the draft EIS, we state that with an improved anadromous fishery in the Klamath River, river angling opportunities would be created, which could attract increased numbers of anglers to the Klamath River, potentially increasing business opportunities for angling guides. We added text to section 3.3.6.2.2, *River Recreation* to emphasize that any action alternative that results in restoration of andromous fish upstream of Iron Gate dam would also create enhanced angling opportunities. The effects of successful anadromous fish restoration are discussed in socioeconomic resources section 3.3.8.2.3, *Commercial Fishing, Recreational Ocean Fishing, and the Tribal Fishery*, of the draft EIS.

R-81 Comment: Interior (p. 87), commenting on page 3-447, lines 17-35, of the draft EIS, states that our discussion of flow information measures also should address other flow timing issues. As discussed on page 3-403, lines 28-30, of the draft EIS, timing of peaking releases and advance knowledge of scheduled releases are necessary for outfitters to market, sell, and conduct trips. Assuming PacifiCorp follows a defined release schedule that would be set in a new license, it is important to provide outfitters with any changes or alterations to this schedule as soon as possible (e-mail).

Response: It was our intent to include these elements in the description as they are discussed in the subject paragraph. For clarity, we modified the indicated text in this EIS. Outfitters that have access to email also would have access to the Internet and it would be in their best interest to check PacifiCorp's designated web page prior to embarking on specific trips for any changes or alterations to scheduled peaking flow releases rather than depending on an e-mail notification from PacifiCorp.

R-82 Comment: Interior (pp. 67 and 68), commenting on page 2-46, lines 19-22, of the draft EIS, states that PacifiCorp should be required to provide predictive river flows in addition to real time flows provided from the USGS gage so recreational whitewater boaters can plan trips weeks or days in advance.

Response: We agree that providing predicted flows on PacifiCorp's web site would assist whitewater boaters and anglers in planning trips in advance. We modified the text on in section 5.1.1.2 of this EIS to clarify the staff recommendation as it relates to providing flow information that pertains to real time and

projected flows, generation times, scheduled outages, and provisions for prompt posting of any changes to scheduled flow releases.

R-83 Comment: PacifiCorp (p. 2-4), commenting on our recommendation that the proposed flow-related information that would be made available to the public include real-time flow information at all telemetry-gaged project reaches, assumes that this requirement could be met by providing a link to the existing USGS telemetry gates at project reaches and that no new equipment would be installed in the field.

Response: We do not expect new equipment to be installed in the field to accommodate transmittal of real-time flow information to a website for public use in planning recreational activities in project reaches. However, we note that a new gage is recommended for installation in the J.C. Boyle and Copco No. 2 bypassed reaches, and we also expect final flow gaging information to be developed as part of our recommended project operations management plan. To the extent that new flow gages generate real-time data that can be transmitted to the public, we expect PacifiCorp to accommodate this information in it public Internet site.

R-84 Comment: PacifiCorp (pp. 2-7, 3-62, and 5-13) states that it is willing to participate in a feasibility study for enhancing communications between the J.C. Boyle powerhouse and the Stateline Take-out, as we discuss on page 3-425 and recommend in measure 24S and section 5.2.14, *Recreation Resource Management*, of the draft EIS. However, PacifiCorp points out that it is not their responsibility to communicate law enforcement emergencies, wild fires, or other non-project-related events within the peaking reach or ensure that the public is equipped with adequate personal communication capabilities. PacifiCorp does not support any enhanced communication system that would impact Wild and Scenic River values and characteristics found along the peaking reach.

Response: We concur with PacifiCorp's interpretation of appropriate limits to our recommended measure and they are consistent with our analysis on page 3-426 of the draft EIS.

R-85 Comment: On page 3-448 of the draft EIS, we state: "Dam removal also would create improved conditions for river angling and whitewater boating." PacifiCorp (p. 3-63) comments that this statement oversimplifies complex changes that may occur with dam removal. PacifiCorp states that removal of Copco and Iron Gate dams would probably create new whitewater boating opportunities on reaches currently covered with flatwater and would probably produce additional river angling opportunities as well. However, PacifiCorp thinks it is premature to predict the quality or either of these types of opportunities without additional information about rapids and flow regimes. PacifiCorp believes that if a dam removal alternative is pursued, we would need to provide more careful reviews of potential benefits and impacts.

Response: We explain our rationale for expecting increased opportunities for whitewater boating opportunities and angling in the last two paragraphs of section 3.3.6.2. To simplify our text, we deleted the sentence mentioned in this comment from this EIS.

R-86 Comment: The city of Yreka (p. 5) notes that the city benefits economically from the diverse recreation provided by existing lakes and rivers, but there appears to be a disparity in the value assigned to existing lake recreation versus river recreation in the draft EIS and by other regulatory agencies. The preponderance of opinion in the draft EIS appears to be weighted towards river recreation, which diminishes the value of existing lakes in the dam removal analysis.

Response: We do not agree that our analysis in the draft EIS is biased toward river recreation. Several recommendations included in the Staff Alternative reflect the importance of reservoir-based opportunities

to provide for public recreation needs at project reservoirs. In addition, in section 3.3.6.2.3, we describe the reservoir-based opportunities that would be eliminated if the project dams were removed.

R-87 Comment: American Whitewater (p. 5) feels that removal of two dams would yield only benefits to paddlers and would not have any negative impacts. Although the quality of previously inundated river reaches would be impossible to predict, it seems highly likely that the reaches would be desirable based on scenery, gradient, flow, remnant reach characteristics, and appeal of paddling a restored river. The opportunity to paddle long sections of the Klamath River featuring overnight camping would offer new and desirable opportunities. American Whitewater notes that the demand for overnight river trips is so high in the Pacific Northwest that the majority of rivers currently providing these opportunities have competitive permit systems. Fishing would likely be good and float fishing could be a desirable activity.

Response: We discuss the effects of dam removal on whitewater boating opportunities and river angling in section 3.3.6.2.3, *Development Decommissioning and Dam Removal* (on page 3-448, lines 10-11, of the draft EIS) and acknowledge that dam removal would create improved conditions for river angling and whitewater boating, although this would be offset to some degree by the loss of boating opportunities in the peaking reach during the summer. We added table 5-2 to this EIS, which presents the costs, benefits, and uncertain effects of dam removal. In this table, we list loss of commercial whitewater rafting in the peaking reach as a cost of dam removal, the increased length of whitewater boating runs and increased riverine angling opportunities as a benefit, and the quantification of increased whitewater boating opportunities as an unknown effect.

R-88 Comment: Interior (p. 87) notes that in our discussion of *Development Decommissioning and Dam Removal* (section 3.3.6.2.3) on page 3-448, of the draft EIS, we state: "Commercial whitewater boating companies would probably not be able to sustain a profitable business with this uncertainty and they would likely go out of business." Interior comments that the opportunity for mid-summer whitewater boating would be reduced under this alternative and it is likely that revenues for companies offering trips on the upper Klamath River would be correspondingly reduced. However, since none of the commercial boating companies run trips exclusively on the peaking reach, it would be hard to quantify whether companies which offer other whitewater boating opportunities would remain profitable or go out of business. In addition, there could be some additional whitewater trip opportunities, such as early summer multi-day trips along suitable reaches of the Klamath River that are currently inundated by reservoirs. In addition, some of the NEPA alternatives considered would provide new business opportunities in guided fishing trips for anadromous fish. Conservation Groups (p. 16) state that the EIS should either provide analysis and evidence to support this statement in the draft EIS or delete this statement.

Response: In this EIS, we modified the text to reflect the uncertainty associated with the profitability of commercial whitewater boating companies under a dam removal scenario.

R-89 Comment: On page 3-448 of the draft EIS, we state: "River angling opportunities would be created and likely improved if decommissioning improves the anadromous fishery in the Klamath River." PacifiCorp (p. 3-64) states that it is unclear if restoration of anadromous fisheries would create new sport fisheries in any near-term timeframe.

Response: We recognize that during the initial phases of any anadromous fish restoration effort, appropriate agencies may elect to impose restrictions on angler harvest to ensure the success of such efforts. However, if any such restoration efforts are successful, we are confident that both riverine and oceanic recreational angling opportunities would eventually be enhanced.

LAND USE AND AESTHETICS

L-1 Comment: Interior (p. 87) notes that the draft EIS incorrectly states on page 3-449, lines 25-26, that there is Bureau of Land Management ownership of lands along the Keno reservoir shoreline. This should be designated Bureau of Reclamation ownership.

Response: We revised section 3.3.7.1.1, *Land Ownership*, to indicate Reclamation management of these federal lands.

L-2 Comment: Interior (p. 88), commenting on the top right paragraph of table 3-101, page 3-460 of the draft EIS (pertaining to conditions associated with land managed by the Bureau of Land Management), states that PacifiCorp must accept responsibility for conducting necessary restoration of impacts from project operations – even if the license is transferred to another entity. This includes restoration of project impacts that PacifiCorp has chosen to remove from its project boundary.

Response: As we note on page 3-463, lines 8-14, of the draft EIS, any future proposal to surrender the project license, abandon any project facility, modify the project boundary, amend the license, or transfer the license to another entity would require a separate proceeding that would address the standards of restoration.

L-3 Comment: Interior (p. 88) asks that our EIS provide the data or references for the 7,599 and 490 acreages cited on page 3-461, lines 38-45, of the draft EIS.

Response: The cited acreages were provided by PacifiCorp in its proposed alternatives to Interior's section 4(e) conditions, filed with the Commission on April 28, 2006. We added the reference citation to section 3.3.7.2.1, *Land Management and Use*.

L-4 Comment: Interior (p. 88), commenting on page 3-465, lines 21-25, of the draft EIS, states that because PacifiCorp made no effort to consult with the Bureau of Land Management when developing the Road Inventory Analysis and Roadway Management Plan (October 2004), and the draft EIS does not disclose what the effects would be from implementing road actions, the public will not be informed of the effects of PacifiCorp's actions.

Response: Draft EIS **s**ection 5.2.16, *Road Management*, states our conclusion with respect to the road management plan as proposed by PacifiCorp and as specified by the Bureau of Land Management in its preliminary 4(e) conditions. That conclusion indicates that implementing the road management plan would improve access management and road maintenance, as well as coordination with the Bureau of Land Management. In its October 2004 draft Project Roadway Management Plan, PacifiCorp provides a list of roads it proposes to close. In section 5.1.1.2, Staff Alternative, of this EIS, we recommend that PacifiCorp consult with the Bureau of Land Management, Oregon Fish & Wildlife, and Cal Fish & Game in the finalization of the Roadway Management Plan. Because the specific road closures and details of road maintenance responsibilities implemented under the plan have not been finalized, this EIS does not include a detailed analysis of potential environmental effects.

L-5 Comment: Pacific Coast Federation of Fishermen's Associations et al. (p. 69) states that our EIS should analyze road management for consistency with aquatic habitat enhancements and other similar salmonid and watershed restoration plans in the basin.

Response: In the final road management plan submitted to the Commission for approval, we expect the specified road management practices to be developed in consultation with appropriate state and federal resource agencies. These agencies would be most familiar with ongoing aquatic habitat restoration plans

elsewhere in the basin, as well as those specific to the project, and would be in the best position to ensure that the road management plan is consistent with other ongoing aquatic enhancement initiatives.

L-6 Comment: On pages 3-465 and 3-466 of the draft EIS, where we discuss road management, we state: "… we note that PacifiCorp has offered no explanation or reasoning behind its proposal to exclude from the project boundary several roads that are within the existing project boundary." We make a similar statement in section 5.2.16 of the draft EIS. In response to this statement, PacifiCorp (pp. 3-64 and 5-14) comments that in the road plan, any road that is not included in the proposed project boundary is not necessary for operation and maintenance of the project.

Response: We revised the text of sections 3.3.7.2.2, *Road Management*, and 5.2.16, *Road Management*, to reflect PacifiCorp's statement that roads proposed for exclusion from the project boundary are not necessary for the operation and maintenance of the project.

L-7 Comment: On page 3-466 and in section 5.2.15 of the draft EIS, in our discussion of road management we state: "The plan would be much more useful in defining PacifiCorp's road management responsibilities if it defined the miles, levels of use, and projected future use of roads necessary to operate and maintain the project, and offered a rationale as to why other roads should not be PacifiCorp's responsibility." In response, PacifiCorp (p. 3-64) comments that the existing plan contains only those project area roads that are necessary to operate and maintain the project, including the mileage of such roads. The plan also defines the maintenance levels of each road, which provides an indication of expected near-term project-related future use of the road. These maintenance needs would be periodically re-evaluated during the term of a new license. Roads not included in the inventory are not necessary for the continued operation and maintenance of the project and are not PacifiCorp's responsibility. PacifiCorp states (p. 5-14) that when the draft Road Management Plan is updated and finalized, it intends to clarify its road management responsibilities in more detail, as we recommend.

Response: We revised the text of sections 3.3.7.2.2, *Road Management*, and 5.2.16, *Road Management*, to reflect PacifiCorp's statement that roads proposed for exclusion from the project boundary are not necessary for the operation and maintenance of the project. Defining maintenance for all project-related roads, and periodic re-evaluation of such maintenance levels are appropriate elements of road management.

L-8 Comment: In section 5.2.16, *Road Management*, of the draft EIS, we recommend inclusion of Topsy Grade Road from its intersection with Route 66 to the intersection of the road that provides alternative access to the Red Barn and J.C. Boyle dam. In response, PacifiCorp (pp. 5-14 and 5-15) notes that much of this road segment is not owned by PacifiCorp but it will consider acquiring an easement or other agreement along this route from private owners to facilitate continued long-term public and PacifiCorp access to the project. After a road easement or agreement is acquired, the road would be included in the project boundary, although operation and maintenance responsibilities along this road will likely be shared.

Response: We revised the text of section 5.2.16, *Road Management*, to reflect PacifiCorp's intention to consider an easement or other agreement for maintenance of this road. In this EIS, under the Staff Alternative, we continue to recommend inclusion of the road within the project boundary.

L-9 Comment: Interior (p. 88), commenting on page 3-467, lines 12-19, of the draft EIS, states that we do not disclose the effects of PacifiCorp removing facilities from the project boundary. This includes facilities that were specifically built for construction and operation of the project (e.g., the Lower Powerhouse road).

Response: Facilities removed from the project boundary would continue to be maintained by the owner(s), as appropriate. We revised the text of section 3.3.7.2.3, *Project Boundary*, to clarify this point. PacifiCorp's draft Roadway Management Plan indicates that the Bureau of Land Management currently maintains Lower Powerhouse Road. Although most of Lower Powerhouse Road no longer serves project purposes, this road continues to serve as an access road for forest fire fighting and public recreational purposes on Bureau of Land Management lands, as it has since the completion of construction of the J.C. Boyle powerhouse.

L-10 Comment: Interior (pp. 43 and 88), commenting on page 3-468 of the draft EIS, states that we failed to include what measures would be implemented to improve aesthetic resources for the J.C. Boyle bypass canal. The Bureau of Land Management has previously commented to PacifiCorp on the canal and the need to address aesthetics. The J.C. Boyle dam does not meet Visual Resource Management standards. The timeframe for addressing aesthetics needs to be clearly defined.

Response: Section 3.3.7.2.4, *Aesthetic Resources*, is intended to present the proposals of PacifiCorp and the recommendations of other parties, including the Bureau of Land Management, with respect to aesthetic resources, and to present our analysis of the merits and drawbacks of each proposed or recommended action. Our recommendations with respect to what actions should be included in a new license are stated in section 5.2.15, *Aesthetic Resource Management*. With respect to the bypass canal, our recommendations in the draft EIS do not include treatment of the bypass canal, because it was not listed as inconsistent with its Visual Resource Management class in PacifiCorp's *Land Use, Visual, and Aesthetic Resources Final Technical Report* (PacifiCorp, 2004k). In this EIS, we recommend that PacifiCorp address the bypass canal in its proposed Visual Resources Management Plan. With respect to J.C. Boyle dam, the draft EIS acknowledges that the dam does not meet Visual Resource Management standards (draft EIS, p. 3-456, lines 8-10). The timeframe for implementation, as noted in the draft EIS, is "within 15 years of the new license." The timeframe for specific actions may be spelled out when the RRMP is finalized.

L-11 Comment: PacifiCorp (pp. 2-5, 3-64, and 3-65) states that our analysis on page 3-469 and our recommendation to include vegetative screening or repainting for the Fall Creek and Copco No. 2 facilities in PacifiCorp's proposed visual resources management plan would likely cause adverse effects to these historic properties. These measures would be subject to consultation with the State Historic Preservation Officer.

Response: We revised the text of sections 3.3.7.2.4, *Aesthetic Resources*, and 5.2.15, *Aesthetic Resource Management*, to drop our recommendation concerning painting and to include consultation with the California SHPO with regard to vegetative screening.

L-12 Comment: The city of Yreka (p. 5) states that the availability of open water for fire-fighting makes an extremely valuable contribution in the region, but has not been identified or considered in any of the dam removal alternatives evaluated in the draft EIS. Fire safety is the number one reason Californians give for supporting reservoir development and it follows that the same logic would apply to not destroying existing reservoirs.

Response: The issues of fires and fire safety have not been raised previously with respect to relicensing the project. As presented in the draft and this EIS, the Staff Alternative would retain the existing reservoirs, which would thereby maintain any associated fire suppression benefits. If one or more of the dams were removed, the riverine portion of the Klamath River could still serve as a source of water for fire suppression with the installation of appropriate hydrants. However, the reservoirs would no longer be available for aerial water pick-ups.

SOCIOECONOMICS

S-1 Comment: Interior (p. 88), commenting on page 3-487 of the draft EIS, states that the number of rafting days should be updated with the Bureau of Land Management model, as updated in the ALJ hearing record.

Response: In this EIS, section 3.3.6.2.2, *River Recreation*, we revised our analysis under *Flow Measures, J.C. Boyle Peaking Reach*, to include the estimates of boating days using both our model as well as the Bureau of Land Management's model. We revised the text of section 3.3.8.2.2, *Recreation, J.C. Boyle Peaking Reach*, to be compatible with that analysis, and note that fewer boatable days are predicted to occur under the Bureau of Land Management 4(e) condition using our model in part because it considers project operational constraints that are not considered in the Bureau of Land Management's Flow Management Scenario model.

S-2 Comment: Commenting on our analysis of the socioeconomic effects on commercial, tribal, and recreational ocean fishing Best Case, With Dam Removal scenario, discussed on pages 3-489 and 3-490 of the draft EIS, PacifiCorp (p. 3-65) states that our conclusions do not reflect the relative or absolute uncertainties associated with reintroduction, or the temporary total loss in the downstream recreational, commercial, and tribal fishing for the 10 to 20 years that it would take to restore the fishery after removing the dams and the fish hatchery. PacifiCorp suggests that available data indicate that temporary losses in earnings for the local communities downstream of Iron Gate dam would amount to tens of millions of dollars in the recreation and commercial fishing industries, and that indirect and induced impacts would add to the losses. PacifiCorp states that local governments would receive less in business taxes and thus would be less able to support community services, and that the tribal, commercial, and subsistence fisheries would sustain losses in proportion to their share of the total allowable harvest. PacifiCorp states that we should more explicitly state these economic losses and associated socioeconomic impacts on local communities to give the alternatives balanced consideration.

Response: With respect to our description of the Best Case, With Dam Removal scenario in section 3.3.8.2.3, *Commercial Fishing, Recreational Ocean Fishing, and the Tribal Fishery*, we revised the text to reflect more of the uncertainties raised by PacifiCorp in its comments. However, we do not agree that there would necessarily be a total loss of fishing for 10 to 20 years following dam removal, and also include that conclusion in the revised text.

S-3 Comment: PacifiCorp and Siskiyou County (p. 5) comment that our analysis falls short of a benefit-cost analysis of dam removal and of estimating the economic and socioeconomic impacts of dam removal as they relate to the non-power impacts. PacifiCorp indicates that we could provide estimates of the economic losses for local and regional communities based on existing conditions and projections for the future conditions with anticipated population growth.

Response: We agree that the draft EIS does not present a benefit-cost analysis of dam removal, nor was it intended to. Rather, both the draft and this EIS present a more qualitative discussion of various potential non-power benefits and costs, with dollar estimates where they are available. We conclude that it would not be fruitful to try to estimate economic benefits or losses to local and regional communities, because of the very uncertainty that PacifiCorp cites in its comments. Because of disease problems in the lower river, there is great uncertainty about the future of the Klamath River fishery whether dams are removed or not.

S-4 Comment: Siskiyou County estimates that with dam removal, tax revenue would decrease by about $1.1 million because of the substantial loss of property value at the 1,500 privately owned parcels that abut project reservoirs. Pacific Coast Federation of Fishermen's Associations et al. (p. 20) states that

information on housing that abuts project reservoirs and the impacts on those residents and property values if the reservoirs are drained needs to be assessed in the EIS.

The Karuk Tribe (p. 8) and Pacific Coast Federation of Fishermen's Associations et al. (pp. 18 and 19) state that the EIS should include a detailed analysis of potential economic benefits of dam removal for Klamath and Siskiyou counties, taking into consideration property values as well as regional benefits of dam removal and likely habitat restoration projects. Both entities reference a study that they recently filed entitled "A preliminary economic assessment of dam removal: Klamath River" (Kruse and Scholz, 2006), In addition, the tribe states that we imply in our draft EIS that that the tax benefits associated with the 11,000 acres of project land owned by PacifiCorp would end if the dams were removed. However, the tribe states that there is no analysis of the property tax benefits of dam removal considering the improvements in aesthetics, recreation, and water quality that would result, and this analysis should be included in the EIS.

Response: We agree that it is likely that Siskiyou County would lose all or at least some of the property tax revenue currently paid on the value of the dams, powerhouses, and other project features that would be influenced by dam removal(s), depending on which features are removed and how the value of any remaining features is assessed if the project is no longer operable. However, with respect to other property tax payments, it is not a foregone conclusion that dam removal would necessarily lower property values. We are not aware of any systematic studies that have been done on similar reservoirs that address how property values would change if the reservoirs were removed. A Wisconsin study of reservoirs much smaller than those on the mainstem Klamath River found that residential property in the vicinity of a free-flowing stream was more valuable than identical property in the vicinity of a small impoundment, and that "removing a dam does little harm to property values in the short run (2 years in the study), and serves to increase property values in the long run, as the stream and associated riparian zone matures to a 'natural' free-flowing state, or is managed as desirable open space" (Provencher et al., 2006). In the case of the Klamath River and the project reservoirs, former lakefront properties could be devalued, but nearby properties could also be in great demand if water quality improves and anadromous fish are restored to the system. There is too much uncertainty at this time to speculate on potential effects on property values.

This same conclusion is reached by Kruse and Scholz (2006) in their preliminary economic assessment of dam removal at the Klamath Project. They raise a number of questions that would have to be answered before effects on property values and tax payments could be determined, including (1) who will own the reclaimed land following dam removal; (2) if the reclaimed land changes hands, would the new landowner pay local property taxes; (3) would landowners gain a scenic view of the stream or river and associated riparian areas; and (4) would landowners and/or the public have access to the restored river and reclaimed land for recreation. They add that property values and tax payments associated with reclaimed and surrounding properties would also be affected by what is done with the reclaimed land; for example, it could be held by PacifiCorp, sold to others to be developed privately, converted into a park or conservation easement, and so on. Consequently, we conclude that there is no basis to predict with certainty any changes in property tax revenue to Siskiyou County that may occur following removal of one or more project dams.

S-5 Comment: NMFS (p. 38) states that the burden of societal costs should be factored into the staff's decisions regarding the cost of fish passage. NMFS comments that, for decades, operation of PacifiCorp's hydropower complex (originally licensed by the Commission without adequate measures to conserve fisheries resources) has resulted in considerable fragmentation and degradation of Klamath River habitat, contributing to a serious decline in Klamath River salmon populations. Therefore, the agency states that the costs of volitional passage must be compared to the past, present, and future costs borne by the fishing industry, tribes, and other environmental stakeholders who have suffered a disproportionate economic burden. Furthermore, the agency states that the on-going costs involved with

administering planning and recovery actions for endangered species are significant to society, and that these costs should also be weighed against the costs of fish passage. NMFS comments that the regulatory costs alone are quite substantial, and will persist until de-listing occurs. The agency also comments that, because expanding coho salmon habitat in the project reach would represent an important step toward coho salmon recovery, the costs of volitional fish passage should also be considered from this societal perspective.

Response: The draft EIS, as well as this EIS, clearly acknowledges the decline in Klamath River salmon populations and the project's role in that decline. EIS section 3.3.8.1.2, *Project-related Economic Sectors*, under the headings *Commercial Fishing* and *Tribal Fishery*, includes data showing the reduced value of those fisheries as the salmon population has declined. In this EIS, we added additional information with respect to the effects of the decline in the tribal fisheries. We continue to conclude, however, that there are too many unknowns associated with implementation of volitional fish passage, especially regarding potential losses of smolts during reservoir passage and future trends in the severity of disease issues in the lower Klamath River, to make any reasonable estimate of its monetary costs and benefits. As a result of these considerations, we modified the Staff Alternative to include a comprehensive approach to restoring anadromous fish runs that would address uncertainties regarding the effects of project reservoirs on downstream water quality conditions, explore potential methods for addressing water quality and disease issues, proceed immediately with the restoration of anadromous fish runs to habitat upstream of Iron Gate dam, and assess critical uncertainties regarding the effectiveness of volitional and non-volitional passage techniques. We conclude this represents a prudent path to determine the most beneficial approach for restoring anadromous fisheries in the Klamath River and contributing toward the recovery of the SONCC coho salmon ESU.

S-6 Comment: The Yurok Tribe (p. 53) states that the 5-mile and 50-mile corridor for the socioeconomic analysis offered by PacifiCorp and adopted in the draft EIS "…effectively makes insignificant the representation and issues of Tribes that live on the Klamath River and its tributaries and improperly distorts the real impact the Project has on those Tribes." The reason given is that these corridors dilute the representation of tribes in the socioeconomic analysis, and masks the disproportionate impact of the project on the tribes (p. 62).

The Yurok Tribe (pp. 63 and 64) also states that the draft EIS uses county, city, and census-designated-place data while ignoring the cognate 2000 census data available for reservations and non-reservation trust land, noting that table 3-104 in the draft EIS presents data for all downstream areas except a major section of the Yurok Reservation from Weitchpec downstream to Johnsons. The Yurok Tribe comments that the unused data paints a very different picture regarding the ethnicity of the people in this region, which the tribe reports is 75 percent American Indian alone or in combination with one or more other races, and that the draft EIS does not show that the populations on the two reservations grew by an average of 46 percent between 1990 and 2000. The tribe comments that there is no excuse for excluding from our analysis sources of data on affected tribes.

Response: Although the information relative to the 5-mile and 50-mile corridors does not include specific project effects on the tribes (or on other specific groups or communities), the corridors reflect the geographic scope of the socioeconomic studies agreed upon in the socioeconomic study plans (PacifiCorp, 2002, 2003a or b). Project effects specifically related to the tribes are addressed in several sections of the EIS, including section 3.3.8.1.2, *Project-related Economic Sectors, Tribal Fishery*; section 3.3.8.2.3, *Commercial Fishing, Recreational Ocean Fishing, and the Tribal Fishery*; and 3.3.8.2.4, *Minority and Low Income Populations.* In response to the Yurok Tribe's comment, we added additional information to section 3.3.8.1.1, *Demographic Characteristics*, to reflect tribe-specific census data for the Yurok, Karuk, and other reservations and tribal trust lands.

S-7 Comment: The Water Board (p. 8) and Pacific Coast Federation of Fishermen's Associations et al. (pp. 18 and 19) state that a healthy population of anadromous fish provided economic benefits to commercial and recreational fishermen, coastal and river fishing communities, and cultural, spiritual, and social values of tribes. They comment that this is not accounted for in our developmental analysis, and that the effects of each alternative on the anadromous fishery and the related economic effects on the public and tribes should be evaluated in the EIS. Similarly, Joyce King (p. 2) comments that the draft EIS does not provide comparisons of health, quality of life, and economic effects on consumers, businesses, and communities, including medical, cleanup, restoration, and other externalized costs borne by taxpayers with those benefiting from low-cost energy and recreation generated by the four lower dams.

Response: EIS section 4.0, *Developmental Analysis*, is not intended to be a benefit-cost analysis in the sense that all positive and negative effects are compared in dollar terms. The developmental analysis is limited to the economic effects of the alternatives on the value of power. Project effects on the tribes and on commercial and recreational fishing are discussed in several other sections of the EIS, including sections 3.3.8.1.2, *Project-related Economic Sectors*; 3.3.8.2.3, *Commercial Fishing, Recreational Ocean Fishing, and the Tribal Fishery*; and 3.3.8.2.4, *Minority and Low Income Populations.* In this EIS, we added table 5-2 in section 5.2.21 to summarize many of the potential effects of dam removal as a means of restoring a healthy population of anadromous fish to the river.

S-8 Comment: The American Sportfishing Association (pp. 3 and 4) comments that the draft EIS does not acknowledge the impact an improved salmon recreational fishery would have on the economy of region. The current use of 93,000 angler days resulting in the expenditure of $5,786,990 could be greatly increased by improved fisheries but the draft EIS makes no attempt to quantify or value the such an enhanced recreational fishery with fewer restrictions. The Association suggests that since the dams have been in place for more than 50 years, it would seem appropriate to seek and estimate of fish populations that would return to the river if the project dams were removed by looking at population projections based on pre-dam construction dates. Although this data may not be available from historical records, many population projections are based on models that can give some estimate of the overall potential population. This data would likely show that use of the Klamath River and affected marine areas and associated economic effects would be much greater than reflected in the 1987-89 numbers used on page 3-489 of the draft EIS. American Whitewater (pp. 5 and 6) states that the draft EIS significantly undervalues the recreational benefits of removing Iron Gate and Copco dams and scarcely mentions the benefits of removing the other two main stem dams. They feel that the recreational and economic value of restoring sections of the Klamath River that are now impounded or bypassed for boating and angling would be staggering. American Whitewater states that we should conduct an analysis predicting recreational benefits of restored river reaches associated with whitewater boating as well as a restored salmon fishery using similar studies conducted elsewhere (sources of these studies are provided).

Response: The draft EIS acknowledges in section 3.3.8.2.3, *Commercial Fishing, Recreational Ocean Fishing, and the Tribal Fishery*, that the "Base Case with Dam Removal" would be the best combination of actions for restoring the economic benefits associated with recreational, commercial, and tribal fishing. However, we do not estimate what the value of those benefits might be because there is too much unknown about the possible fish population; the fisheries management decisions that could be made relative to the KMZ; and the extent of participation in the recreational fishery, both in numbers of people and level of effort. Given the number of conditions that have changed since the dams were built, including water quality and land use changes, the pre-dam fish population does not appear to be a useful predictor of restored fish populations.

S-9 Comment: The Karuk Tribe (p. 7) states that there should be an environmental justice section in the EIS because the tribes have born the brunt of negative impacts but have received few benefits (many Karuk and Yurok communities currently do not have electricity). The Tribe states that the environmental

justice section should thoroughly analyze the health and economic consequences of the rapid diet shift imposed on the tribes by the denied access to traditional foods as a consequence of project operations, including increased health care costs. Similarly, the Yurok Tribe (p. 53) comments that a socioeconomic impact assessment must evaluate the impacts of the proposed federal action on low income and minority populations, including project-specific and cumulative effects of the project on demographics, employment, income levels, aesthetic environments, and community-specific social, health, and economic conditions. For the Yurok Tribe, this includes properly assessing the role of the Klamath River in the cultural and subsistence practices of the tribe and the project impact on those values. The Yurok tribe states that the draft EIS fails to adequately assess or consider these criteria and to address environmental justice issues. The Yurok Tribe (p. 60) further states that the draft EIS mischaracterizes the demographic and economic realities of Native American communities within the Klamath River Basin, the impact of the loss of the tribe's subsistence and commercial fishery on the tribal and reservation communities and economies, and the significance of the Klamath River and the health of the Klamath River ecosystem to the past, present, and future Yurok People. Joyce King (p. 2) comments that the draft EIS does not disclose past cumulative effects on Native American cultures in the Klamath Region from disease, genocide, habitat degradation, government mismanagement and misappropriations, alcohol, and drugs. The Natural Resources Services Division of the Redwood Community Action Agency (p. 1) also states that the EIS needs to address social and environmental justice issues.

Response: Draft EIS sections 3.3.8.1.1, *Demographic Characteristics, Employment and Income*, 3.3.8.1.2, *Project-related Economic Sectors, Tribal Fishery*, and 3.3.8.2.4, *Minority and Low Income Populations* clearly indicate the current economic status of the tribes and the health and economic problems, including their high incidence of diabetes. In this EIS, we revised section 3.3.8.1.1 to include tribe-specific census data concerning the economic situation on the reservations within the six-county study area. In Scoping Document 2, we noted that the EIS would address whether relicensing the project "would disproportionately influence any minority and low-income populations," which is the population covered by the concept of environmental justice. We address this topic in draft EIS section 3.3.8.2.4, *Minority and Low Income Populations*. In this EIS, we revised the section name to *Minority and Low Income Populations (Environmental Justice)*, to make that point.

S-10 Comment: KWUA (pp. 6 and 7) states that the draft EIS contains only a superficial analysis of the adverse impacts of the historic electrical rate set in the 1956 contract between Reclamation and Copco (PacifiCorp) and does not even discuss what the magnitude of the electric rate increase may be. KWUA comments that the omission of this essential fact renders the analysis inadequate because it does not meet the "hard look" at such factors required by NEPA. KWUA states that page 3-493 of the draft EIS includes a summary statement regarding a loss of profit for irrigators if the electric rate is increased, but that any meaningful analysis of impacts on employment, local governments, or other socioeconomic values is altogether lacking.

Response: We revised the text of section 3.3.8.3.3, *Agriculture*, of this EIS to acknowledge that the rate increase would potentially have adverse effects on employment, local governments, and other economic sectors, as well as adverse effects on irrigators' profits. However, we have not added any further analysis of rate impacts, because the rate increase is not the subject of this EIS and is not related to relicensing except in the context of cumulative impacts. As we state in the draft EIS, any negative socioeconomic effects of relicensing would add to the negative effects of a rate increase.

S-11 Comment: KWUA (pp. 6 and 7) states that the draft EIS fails to evaluate the effects of increased electrical rates on water use and water efficiency within the Klamath Irrigation Project. Increases in power rates would discourage use of sprinkler irrigation and water technologies that achieve efficiency. If land should be withdrawn from production because of the increase in electric rates, the draft EIS should evaluate the adverse impacts on communities and wildlife of such change in use.

Response: Water usage in the Klamath Irrigation Project is governed by complex water rights based the Reclamation Act of 1902. Since then other water rights and usage requirements have been enacted and, in recent years, additional regulations have resulted from the NMFS BiOp and the NWS BiOp. We understand that changes in the power rates could cause changes in irrigation and water usage which might affect the amount of irrigated land and the means of irrigation; however, the entire scope of possible changes are beyond the Commission's jurisdiction. Removing land from production would result in a change in the composition of plant species that occur on that land and therefore would likely result in a change in the wildlife species that use those plants. Species that currently depend on land in production for all or some of their habitat needs may no longer occur in the vicinity of the Klamath Irrigation Project, but other species would fill the niche created by the change in land management.

S-12 Comment: KWUA (pp. 6 and 7) comments that the draft EIS does not address the consequences of higher electric rates for the water supply of the Lower Klamath National Wildlife Refuge. The primary source of water for this refuge is the D Pumping Plan, which is energy intensive. Increased electric rates would force this plant to operate less frequently, and the EIS should assess the implications of this on the refuge, as well as the abundant wildlife that rely on other irrigated farm and ranch land.

Response: We revised the text of section 3.3.8.3.3, *Agriculture*, of this EIS to note the potential adverse effect of rate increases on both cropping patterns and pumping costs to provide water for the wildlife refuge. We also addressed the potential effect of decreased water supply on the national wildlife refuges.

S-13 Comment: The Yurok Tribe (pp. 55-58) states that appropriate site-specific socioeconomic analysis has not yet been conducted by PacifiCorp, and that the Commission should require PacifiCorp to fund and complete the federally and other mandated studies and analysis necessary for the Commission to make an informed decision on proposed actions, the project, or the license application. The Yurok Tribe states that these studies must be conducted by the tribes, because of their unique knowledge, and that they are the only entities that have the professional expertise, cultural and social insights, and access to confidential tribe-specific data necessary to perform the accurate and meaningful analyses required before the Commission can make a determination on project impacts, as mandated under NEPA. The Yurok Tribe provides information in response to what the tribe calls inadequate information provided by PacifiCorp that forms the basis for our socioeconomic analysis in the draft EIS. The tribe notes that grants for environmental justice pilot studies have been awarded to five tribes for the purposes of completing environmental justice studies that pertain to the impact of the project on each tribe. The tribe states that the Commission should defer its final NEPA assessment until these ongoing studies are completed.

Response: The Commission does not require site-specific or group-specific socioeconomic analyses for tribes or other communities to make informed decisions in relicensing proceedings, nor does NEPA require such analyses. With respect to PacifiCorp's funding of studies, we note that PacifiCorp has funded ethnographic/TCP studies by the Karuck, Yurok, Klamath, and Shasta tribes, and also provided funding for the KRITFWC riverscape report (King, 2004).

We revised the text of this EIS in sections 3.3.8.1.1, *Demographic Characteristics, Employment and Income*, and 3.3.8.1.2, *Project-related Economic Sectors, Tribal Fishery*, to incorporate additional information provided by the Yurok Tribe; however, this did not alter our conclusion that most of the project effects on the tribe were associated with original project construction, and thus are not subject to additional analysis during a relicensing proceeding except in the context of cumulative impacts. We note in this EIS text the fact that environmental justice studies are ongoing. However, because various studies related to one or more resources are virtually always in process during relicensing proceedings, the Commission does not generally defer its final NEPA assessment until all such studies are completed.

S-14 Comment: The Yurok Tribe (p. 58) states that the socioeconomic analysis in the draft EIS fails to present any evidence of tribal consultation in the NEPA process by the Commission on project impacts on the Yurok Tribe, as required by applicable statutes.

Response: The socioeconomic section of the EIS does not address tribal consultation per se, although it does discuss documents filed by the tribes, such as *The Effects of Altered Diet on the Health of the Karuk People* (Norgaard, 2005). We revised section 5.6.6, *National Historic Preservation Act*, to include a discussion of tribal consultation during this relicensing proceeding.

S-15 Comment: Interior (p. 88), commenting on page 3-492, lines 5-32, of the draft EIS, states that Reclamation disagrees with many of the assumptions and conclusions of the Jaeger report. The cost per acre is not consistent across Reclamation's Klamath Irrigation Project, and some of the most productive lands would have a disproportionate increase in power costs compared to the rest of the irrigated lands. Additionally, Interior states that 88,000 acres is a significant portion of the Reclamation project, the loss of which would cause severe effects within the agricultural support industry. Jaeger also did not take into account the effect of changes in cropping patterns on the food source for the National Wildlife Refuges, a major contributor to the local economies. Similarly, KWUA (p. 6) states that the draft EIS does not recognize that Jaeger was evaluating not only the assumed termination of power rates under the 1956 contract, but also the rates afforded in a distinct area of the Upper Klamath Basin under a completely separate contract. They note that this may explain why Jaeger concluded that increased electric rates could decrease diversions, but the resultant decrease in sprinkler use to more water-intensive methods such as flood irrigation could neutralize the reduction in diversions. KWUA also states that Jaeger did not seem to recognize that irrigation water users in the Klamath Irrigation Project not only pay costs associated with their own pumping, but also reimburse electric costs incurred by irrigation districts and Reclamation.

Response: We revised the text of section 3.3.8.3.3, *Agriculture*, of this EIS to incorporate Interior's and KWUA's concerns about the Jaeger report. However, this EIS is not intended to provide a detailed analysis of the impacts of the expiring contract, but only to consider it in relation to cumulative impacts that may result from this relicensing proceeding. We therefore continue to rely on Jaeger's report because it offers the most comprehensive evaluation on the record to characterize the possible impacts of the rate increase associated with expiration of the 1956 Contract between Interior and Copco.

S-16 Comment: The Yurok Tribe (pp. 84 and 85) states that the socioeconomic cumulative effects analysis (section 3.3.8.3 of the draft EIS) does not follow the CEQ guidance pertaining to analyzing cumulative effects on all types of natural and cultural resources; is inaccurate and inadequate in its examination of the project's cumulative effects on low-income and minority populations, such as Native American tribes; and provides no analysis of the cumulative effects on tribal fisheries.

Response: Section 3.3.8.3, *Cumulative Effects*, is intended to address only cumulative effects on socioeconomic resources, and is thus not the appropriate place to discuss cumulative effects on natural resources; such resources are addressed in appropriate resource sections. With respect to cumulative effects on low-income and minority populations and tribal fisheries, we added a new subsection to our cumulative effects discussion entitled Indian Tribes (section 3.3.8.3.2 of this EIS) that summarizes such effects on tribes.

S-17 Comment: The Hoopa Valley Tribe (pp. 43 and 44) and Klamath Tribes (p. 13) state that section 3.3.8.4 of the draft EIS is misleading and inadequate because it characterizes the adverse impacts "if the project is licensed as proposed" as "unavoidable" because it would continue to block anadromous fish from the Upper Klamath Basin and would "continue to have a depressing effect on socioeconomic sectors dependent on the salmon harvest." They state that dam removal and the Staff Alternative with Mandatory

Conditions would avoid such adverse effects by restoration of anadromous fish to the Upper Klamath Basin by volitional fish passage; it is therefore not accurate to characterize such effects as "unavoidable"; and the EIS should point out that such impacts are avoidable, but the Staff Alternative chooses not to mitigate the project's adverse impacts because of excessive cost to PacifiCorp.

Response: We revised section 3.3.8.4, *Unavoidable Adverse Effects*, to be consistent with comparable sections for aquatic resources, clarifying the adverse effects are unavoidable "without the removal of Iron Gate or Copco No. 1 dams." The intent of the section is to clearly indicate the adverse effects that are not avoidable if certain actions are taken.

CULTURAL RESOURCES

C-1 Comment: Interior (p. 89) commenting on section 3.3.9.1.1 of the draft EIS, states that we do not adequately address the area of potential effects (APE) for the proposed project according to the implementing regulations 36 CFR 800 of the National Historic Preservation Act. Interior asks us to explain how the definition of this APE was developed. For example, why are downstream cultural resources not included in the APE when clearly flooding and sedimentation are issues that affect archaeological sites and traditional cultural properties (TCP) all the way to the mouth of the Klamath River. Interior asks for evidence that this project does not affect such resources. The Yurok Tribe states that the draft EIS fails to adequately address the tribe's concerns about PacifiCorp's handling of the APE issue, although in SD2, we state that we would address APE issues. The tribe concludes that the APE as defined in the draft EIS is not large enough in scope to address impacts of the project on cultural resources significant to the tribe and eligible for consideration under NHPA. Yurok ancestral, aboriginal, and ceded lands have been arbitrarily excluded from the proposed APE. The APE should include a riverscape concepts from the headwaters to the mouth of the river in order to assess project impacts on all affected cultural resources, including anadromous fish. The Karuk Tribe (p. 4) states that the APE should be redefined to include the entire Klamath Basin and the Klamath Management Zone because the project affects the ecology and cultures that rely on these regions.

Response: We revised section 3.3.9.1.1 to more clearly state that the APE described in that section is the one proposed by PacifiCorp in 2006. We also revised text in section 3.3.9.2.2 to provide more discussion regarding the APE we identify for the Commission's undertaking (issuance of a new license).

C-2 Comment: The Karuk Tribe (pp. 4-7) states that the draft EIS does not fully address the significant project impacts on contemporary Karuk cultural and religious resources and practices. Although we acknowledge many of the water quality impacts of the project, the draft EIS fails to fully evaluate how poor water quality directly and indirectly affects contemporary cultural and religious ceremonies. Examples of invertebrate, amphibian, fish, and plant species that are important for various tribal ceremonies and activities are provided, along with a table detailing the timeframe when Karuk Tribal cultural river-related activities occur. To address the perceived deficiencies in the draft EIS, the tribe recommends the following: (1) address the cultural impacts of the project on the fishery, as well as the direct and indirect impacts on materials used in ceremonial regalia and traditional crafts (e.g., birds, plants, and otters); (2) in addition to analyzing project impacts on fish, evaluate the project impacts on other culturally relevant species such as mussels, crayfish, and salamanders; (3) define fish, including salmon, steelhead, lamprey, and sturgeon, as a cultural resource; (4) assess project impacts on water quality from the standpoint of modest human consumption during ceremonies; and (5) evaluate project impacts on traditional food sources other than fish, such as watercress, Indian rhubarb, freshwater mussels, and crayfish. Josh Strange (p. 7) states that the draft EIS continues to ignore salmon and the Klamath River as paramount cultural resources of the indigenous people of the Klamath Basin. The excuse that the "riverscape" is not in the National Register of Historic Places is disingenuous and selectively discounts the beliefs and perspectives of a specific race of people. Susie Van Kirk (pp. 4 and

5) states that the cultural resources section of the draft EIS totally focuses on physical historic and archaeological resources but totally ignores the cultural and life sustaining relationship between the river, salmon, and indigenous people. She states that the EIS should be revised to honestly describe the relationship of indigenous people to the river and the effects of the project on that relationship.

Response: We added text to the affected environment and effects sections of 3.3.9, *Cultural Resources*, to address this and other related comments. In reference to Mr. Strange's particular comment regarding the cultural importance of salmon and other natural resources in the context of the Klamath Riverscape, we note that we do recognize that natural resources such as salmon are contributing elements to the Klamath Riverscape, on pages 3-506 and 3-507 of our draft EIS.

C-4 Comment: Interior (p. 89), commenting on page 3-498, lines 18-29, of the draft EIS, states that PacifiCorp did not consider archaeological sites located on Bureau of Land Management land in its analysis of a potential National Register district. The Bureau of Land Management believes that sites located within the J.C. Boyle peaking reach on Bureau of Land Management land are potential contributing elements to a National Register district. Specifically, sites 35KL22, 35KL24, 35KL550, 35KL558, 35KL567, 35KL576, 35KL577, 35KL629, 35KL630, 35KL632, 35KL633, 35KL635, 35KL785, 35KL791, 35KL1083, and JC03-29 should be included in any analysis of a potential National Register district. Oregon SHPO (p. 1) agrees that sites on Bureau of Land Management lands should be considered in the future analysis of a potential National Register district, and lands within the project boundary as submitted by PacifiCorp in 2004 should be surveyed in their entirety.

Response: In its technical report, PacifiCorp's archaeological consultants appear to have based their "district" groupings of archaeological sites on their being "probably related" and on a "congruent stretch of river." The consultants did not provide explicit rationale for not grouping other sites into potential districts. This precludes neither the Bureau of Land Management nor the Oregon SHPO from determining that archaeological districts exist in addition to those recommended by the consultants.

C-5 Comment: Interior (pp. 68, 69, and 89) and PacifiCorp (pp. 2-7, 2-8, 3-65, 3-66, 3-67, and 5-2), commenting on page 3-28, lines 27-32, of the draft EIS (where erosion of cultural sites is discussed), and our recommendation 28S, state that the issue of project-related flow effects on Bureau of Land Management cultural sites within the J.C. Boyle peaking reach (including the site referred to in the draft EIS) has been addressed, by a stipulation, within an ALJ order dated August 16, 2006. Five sites (35KL21/786, 35KL22, 35KL24, 35KL558, and 35KL577) located on the T-1 terrace will undergo more detailed, site-specific studies (at PacifiCorp's expense and in cooperation and consultation with the Bureau of Land Management) to determine if PacifiCorp's flow operations are causing erosion. PacifiCorp notes that potential effects on cultural resources above the T-1 terrace in the peaking reach lack a nexus to the project.

Response: The Commission thanks Interior and PacifiCorp for information about the ALJ order of August 16, 2006. We understand from these comments that PacifiCorp has agreed to conduct detailed archaeological investigations at five sites in the J.C. Boyle peaking reach to determine the extent of effects from flow operations. We note that the five sites enumerated in the comments are among 18 that the Bureau of Land Management, in its preliminary 4(e) Condition 5, specified that PacifiCorp monitor, stabilize, protect, and/or mitigate for "known damages." We understand that the Bureau of Land Management and PacifiCorp subsequently agreed, per the ALJ order of August 16, 2006, that PacifiCorp's flow operations do not cause erosion at the remaining 13 sites.

C-6 Comment: PacifiCorp (pp. 3-66 and 5-14), commenting on page 3-501, lines 38-46, and section 5.2.17, *Cultural Resource Management*, of the draft EIS, asks us to elaborate on how we distinguish between high flow effects that are not project-related and project flow fluctuations in determining

appropriate mitigation. PacifiCorp maintains that there are no project-related flow fluctuations downstream of Iron Gate dam because Reclamation's BiOp sets those flows and PacifiCorp has no consumptive water rights.

Response: With regard to the J.C. Boyle peaking reach, we concur that it is not possible to separate peaking flow fluctuations from natural fluctuations within the limits of project capacity, and thus it is not possible to attribute erosional effects to one or the other. However, absent project peaking flows, fluctuations would be fewer than with project operations. Thus we must conclude that erosional effects to cultural resources within the limits of project capacity in the Boyle peaking reach, and those caused by erosion within the limits of project capacity (e.g. undermining of terraces containing archaeological sites above the limit of project capacity) would be appropriately attributable to project operations. Regarding the reach below Iron Gate dam, based on our review of available data we concur with PacifiCorp that high flow change events (in excess of the 1,735 cfs capacity of the powerhouse) below the dam (which are most likely to cause erosion) are beyond its control.

Based on information available to us in this proceeding, we maintain our conclusion that project effects on sediment supply contribute to adverse effects on recruitment and maintenance of young riparian vegetation (see our response to GS-15). Riparian vegetation helps stabilize land on river shorelines; thus adverse effects to riparian vegetation can result in destabilization of shoreline containing archaeological sites, thereby adversely affecting those sites. We also note that adverse effects to riparian vegetation may also be considered adverse effects to TCPs, specifically the Klamath Riverscape in which the totality of the natural environment is a contributing element.

C-7 Comment: Interior (p. 89), commenting on pages 3-499, line 32, and 3-500, lines 12 and 18, of the draft EIS, asks why we identify TCPs identified as "potentially" eligible to the National Register of Historic Places in this section of the draft EIS, whereas historic structures and archeological sites are described in the draft EIS as eligible or not eligible for inclusion in the National Register of Historic Places. Section 36 CFR 800.4 (c)(1) requires agency officials to apply National Register criteria to those properties that have not previously been evaluated. This would include TCPs.

Response: We revised the text to clarify that "potentially eligible" sites are those that PacifiCorp's archaeological consultants concluded would require more intensive, subsurface investigations to obtain information necessary to determine if they were or were not eligible for the National Register under Criterion D. The consultants appear to have evaluated a number of other sites as eligible on the basis of sufficient existing information about them to draw that conclusion. The TCPs identified in the reports prepared by the Klamath Tribe, Shasta Nation, and KRITFWC may or may not have archaeological components with information potential, and in many instances have been evaluated as eligible for the National Register on the basis of other cultural values, including characteristics of association under Criterion A. By convention, and consistent with section 106, all potentially eligible cultural resources are to be treated as eligible, unless and until formally determined ineligible for the National Register in consultation with the SHPO.

C-8 Comment: PacifiCorp (p. 3-66), commenting on page 3-503, lines 21-25, where we discuss the Klamath Riverscape, asks if we are assuming that the Klamath Riverscape is a historic property eligible for listing in the National Register of Historic Places. PacifiCorp (pp. 3-66 and 5-14) does not agree that the natural resources associated with the cultural riverscape concept qualifies as a proper subject for consultation under section 106 and finds no support for this position in the National Historic Preservation Act or its implementing regulations.

Response: The KRITFWC report on the Klamath Riverscape concludes that the riverscape is eligible for the National Register, and we concur with this finding. We discuss our reasoning in this EIS.

C-9 Comment: Interior (p. 89) notes that PacifiCorp acknowledges in the Cultural Resources Final Technical Report (p. 3-1) that "some of these sites appear to be affected by Project operations and/or Project-related activities such as public access and recreation." Tables 3.6-1 and 3.6-2 in the Cultural Resources Final Technical report list observed impacts at each of the sites documented during PacifiCorp's inventory. This contradicts the statement on page 3-501, lines 29-32, of the draft EIS. On the following page (3-502, lines 5- 10) the draft EIS indicates that project operations include recreation and other public uses of project lands and waters. Oregon SHPO (p. 2) makes a similar comment and asks us to clarify this discrepancy.

Response: The statement on page 3-501 of the draft EIS is as follows: "In its revised HPMP, PacifiCorp also maintains that because the adjacent land-managing agency (the Bureau of Land Management) regulates public access and recreational activities along the J.C. Boyle peaking reach, any effects to archaeological sites resulting from land use such as grazing and recreation are not attributable to the project." This text is meant to document PacifiCorp's position regarding sites along the peaking reach. The statement on page 3-502 is as follows: "To the extent of PacifiCorp's obligations under the license to provide recreational and other public uses of project lands and waters, effects resulting from public access to locations containing archaeological sites may be considered attributable to project operations." This text is our response to PacifiCorp's position, and is intended to point out that just because land along the peaking reach is managed by the Bureau of Land Management, does not preclude the possibility that project operations may have an effect on archaeological sites.

C-10 Comment: Interior (p. 89), commenting on page 3-503, line 38, of the draft EIS, asks why there is no concurrence from the State SHPOs or tribes on the APE. Was this because tribes and the SHPOs disagree with PacifiCorp's and our definition of the APE, or was there simply no comment? Interior states that, at a minimum, this needs to be explained in the EIS. The Yurok Tribe (pp. 12 and 13) states that the proposed APE has not been determined in consultation with the SHPOs or Tribal Historic Preservation Office as required by NHPA regulations and guidelines.

Response: At several stages during the relicensing process, both SHPOs and the tribes indicated disagreement with the APE proposed by PacifiCorp and described in section 3.3.9.1.1, of the draft EIS. We delineated an APE for the Commission's undertaking (issuance of a new license) that considered those comments as well as our analyses of project effects on a variety of resources; that APE was described in section 3.3.9.2.2. We received no comments on the draft EIS specifically regarding the APE for relicensing described in section 3.3.9.2.2. However, our further analyses of project effects on water quality in the river below Iron Gate dam have prompted us to modify (expand) our APE in this EIS.

C-11 Comment: Interior (pp. 89 and 90) and Oregon SHPO (p. 2) note that, on page 3-504 of the draft EIS, we indicate that the APE should encompass "the entirety of the APE as delineated by PacifiCorp in its October 2004 draft HPMP" regardless of ownership as well as the area between Iron Gate dam and the confluence of the Scott River. This position supports the Bureau of Land Management's contention that surveys within the APE are required and sites within the APE on Bureau of Land Management land need to be included in the historic properties management plan (HPMP).

Response: This text describes the APE for the Commission's undertaking, which is issuance of a new license. The APE for cultural resources management under a new license would be determined by the provisions of the license regarding project operations.

C-12 Comment: Oregon SHPO (p. 1) states that although our draft EIS concluded that Frain Ranch and other campground locations should not be included in the project boundary, they are demarcated within PacifiCorp's 2004 APE. Frain Ranch is heavily used by boaters and anglers, as documented on page 3-

405 of the draft EIS, and damage to cultural sites by river users and recreationists, especially OHV users, is an ongoing concern. It is important that PacifiCorp address OHV use at Frain Ranch and other campgrounds and trails along the river corridor.

Response: Frain Ranch is not currently a part of the licensed project. However, it is appropriately included within the APE of the relicensing action, and may also be included in the APE for the relicensed project. In the event that Frain Ranch is included in the APE of the project as relicensed, cultural resources there would be managed under the provisions of the finalized HPMP.

C-13 Comment: PacifiCorp (p. 3-66), commenting on our analysis of the APE on page 3-504, lines 6-19, of the draft EIS, asks if we are implying that, upon acceptance of a new license, PacifiCorp would be required to conduct pedestrian survey and inventory of cultural resources within the entire APE.

Response: Upon acceptance of a new license, PacifiCorp would be required to appropriately manage (in accordance with a finalized HPMP) all historic properties within the APE of the project as newly licensed. This could potentially include pedestrian survey and inventory of areas heretofore unsurveyed in which historic properties, if they were found to exist, could be affected by operation of the project under the new license.

C-14 Comment: PacifiCorp (p. 3-66) commenting on our determination of the downstream limit of the APE as the confluence of the Scott River, recommends that we conduct a closer evaluation of the sediment budget based on PacifiCorp's comments, and then re-evaluate the downstream limit of the APE. In the absence of such re-evaluation, the extent of the APE should extend no further than the transition from sediment deficit to sediment surplus shown on our adjusted sediment budget (i.e., Vesa Creek at river mile 164.3). Overall, PacifiCorp concludes that the draft EIS does not make a convincing case for how geomorphic processes, water quality and quantity, riparian vegetation, and aquatic resources affect historic properties between the project boundary and the mouth of the Scott River.

Response: We considered the information that PacifiCorp provided in its comments, but retain our conclusion that due to the uncertainty in the sediment transport calculations in PacifiCorp's sediment budget, and in our attempt to conservatively estimate the downstream extent of project effects on sediment, that a sediment deficit could easily exist to the confluence with the Scott River. We also retain our conclusion that the deficit almost certainly does not persist downstream of the Scott River because this watershed inputs more sediment than the entire Klamath River upstream of that confluence. See our response to comment GS-15. We note that we expanded our analysis of the APE in section 3.3.9.2 to further clarify the basis for our APE for the relicensing process.

C-15 Comment: Interior (pp. 40 and 41) states that PacifiCorp should be required to complete and implement an HPMP for the Keno reach.
Response: In the event that the Keno reach is determined to be within the APE of the project as newly licensed, it would be included in the geographical scope of the project's HPMP.

C-16 Comment: PacifiCorp (p. 2-8) interprets the wording of our recommendation 31S to mean that the APE for Keno development, if it is determined to be non-jurisdictional, would be determined when a new license is issued.

Response: PacifiCorp interprets the wording correctly.

C-17 Comment: Interior (pp. 90 and 98) and Oregon SHPO (pp. 3 and 4), commenting on pages 3-506, lines 30-36, and 5-53, lines 34-36, of the draft EIS, state that we conclude that PacifiCorp should complete surveys within the Bureau of Land Management identified units B, D, F, G, L, M, N, O, and P.

The Commission thus eliminates survey requirements in Units A, C, E, H, I, J, and K. Elimination of these key survey units (41.5 acres) is made without explanation or justification. The Bureau of Land Management and Oregon SHPO state that survey within Units A through P should be conducted since they have not been inspected in the past and they are within the APE.

Response: We have reconsidered our position and have revised the text to conclude that PacifiCorp should complete surveys in Bureau of Land Management units A through H along the J.C. Boyle bypassed reach, and on those portions of Bureau of Land Management units I through P lying within the geographic limits of project capacity in the J. C. Boyle peaking reach.

C-18 Comment: Interior (p. 90) asks how we are able to make a determination of effect according to 36 CFR 800.4 (d)(2) and 800.5 for the TCPs in the APE. As currently described in the draft EIS, the eligibility of these properties appears not to have been determined in consultation with tribes and the representative SHPOs of California and Oregon. This should be clarified in the EIS.

Response: TCPs were identified through reports prepared by the Tribes and KRITFWC. PacifiCorp filed all the reports with the Commission, and provided them to the SHPOs either as part of the final license application or as separate, subsequent submissions. We revised the text to clarify this matter.

C-19 Comment: Oregon SHPO (p. 2) states that potential effects on TCPs are not adequately addressed in the draft EIS. Although decommissioning East Side and West Side developments would eliminate any direct effect on the Link River TCP, discussion of indirect effects should be included. The absence of archaeological sites within the Millers Island Oxbow TCP may be a product of the absence of previous cultural surveys rather than the true absence of such sites. Oregon SHPO adds that lands eliminated from the recommended surveys include those associated with the Millers Island Oxbow TCP area, and surveys of this area would be useful in discussions on potential effects on this TCP. Oregon SHPO recommends that a cultural resource survey of lands within this area be completed before an evaluation of potential effects on the TCP is finalized.

Response: We revised the text to clarify that any decommissioning plan for the East Side and West Side developments would provide procedures for resolution of any adverse effects on the Link River TCP from decommissioning. We recognize that lack of recorded sites in the Miller Oxbow area may indeed be a function of lack of archaeological survey there. However, the only project-related recreation facility at Keno is the Keno Recreation Area, outside the Miller Oxbow area (page 3-412 of the draft EIS). The other two recreation facilities, Veteran's Memorial Park and Boat Launch and the Miller Island Boat Launch, are operated by others and not project-related. Therefore, we do not see that the act of removal of Keno development from the licensed project would alter existing conditions of the Miller Island TCP nor of any other cultural resources that may exist in the Miller Island Oxbow area. This area is located in both the Klamath Wildlife Area, managed by Oregon Fish & Wildlife, and the Lower Klamath Wildlife Refuge, managed by FWS, and would continue to be managed by these agencies regardless of the disposition of Keno development in the outcome of this proceeding.

C-20 Comment: Oregon SHPO (p. 2) comments on this statement on page 3-503 of the draft EIS: "Enhancement of fishing access along Big Bend could increase opportunities…to the public at large, and increased visitation could result in inadvertent or purposeful damage or destruction of landforms and other resources at Big Bend that are associated with the TCP at this location." Oregon SHPO states that such effects are not adequately addressed in the draft EIS.

Response: As indicated in section 1.1, *Purpose of Action*, of the draft EIS, the Commission, in deciding whether to authorize continued operation of a hydroelectric project, must also give equal consideration to the purposes of energy conservation, protection and enhancement of fish and wildlife, protection and

enhancement of recreational opportunities, and the preservation of other aspects of environmental quality. In some cases, enhancement of recreational opportunities may lead to adverse effects on cultural resources. We disclose this possibility in the indicated text of the draft EIS. We consider the most appropriate forum for addressing such potential effects to be the HPMP, rather than in specific recommendations for inclusion in a new license. The actual threat to the Big Bend TCP would be minimized by implementing specific measures that would be developed, in consultation with the SHPOs, tribes, and the Bureau of Land Management, during finalization of the HPMP, as indicated in the following comment response. Provisions for periodically updating the HPMP, as we recommend, would provide a means for incorporating additional protective measures, should the need for such be identified once the recreational enhancements in the vicinity of Big Bend are constructed, and the level of public visitation to these sites is established.

C-21 Comment: Interior (p. 90) and Oregon SHPO, commenting on page 3-507, lines 18-23, of the draft EIS, state that review of the HPMP every 3 years should include comments from not only the SHPOs and tribes, but the Bureau of Land Management.

Response: In the draft EIS on page 3-508, and in our recommendation in section 5, we state that appropriate federal land management agencies should be afforded opportunity to comment on revisions to the HPMP. This would include the Bureau of Land Management.

C-22 Comment: Interior (p. 90) notes that there is no discussion on page 3-507 of the draft EIS of how adverse effects on TCPs would be mitigated or lessened as per 36 CFR 800.8 (c)(1)v. If this is addressed in the HPMP, the EIS should say so as it does regarding other historic properties.

Response: Text from page 3-507, lines 5-12, of the draft EIS, has been revised to more clearly state that measures addressing effects on geomorphology, water quality and quantity, and aquatic and terrestrial resources would address effects on TCPs that contain or consist of such resources. Any such natural resource measures required under a new license would be effectively incorporated by reference as part of overall management of historic properties.

C-23 Comment: PacifiCorp's current (March 2006) HPMP does not include 18 National Register of Historic Places eligible sites located on Bureau of Land Management land within the J.C. Boyle peaking reach. The Staff Alternative directs PacifiCorp to revise its HPMP to include historic properties within the APE. Interior (pp. 37 and 98) states that this revised HPMP should include the 18 sites managed by the Bureau of Land Management, which are within the APE defined in the draft EIS, and that this should be reflected in our EIS.

Response: In the event the above-referenced 18 sites or portions of thereof fall within the geographic area to be managed under project operations, as those operations are defined in a new license, their treatment would be covered in the finalized HPMP.

C-24 Comment: Oregon SHPO (pp. 3, 4, and 5) states that it has not received a copy of the March 2006 HPMP and therefore cannot comment on the archaeological monitoring, site evaluation, site protection plans and guidelines, and the proposed timeline for pre-action reviews for ground-disturbing activities. Oregon SHPO notes that it has worked closely with PacifiCorp in developing the HPMP for Prospect Dam and if management measures compare favorably to those outlined in the Prospect Dam HPMP, their office will probably be in general agreement. The March 2006 HPMP will need to be revised to accommodate our recommendation to include Bureau of Land Management administered land within the APE and the need for additional surveys. A discussion of additional lands within the revised APE, archaeological or historic sites contained within them, and any site preservation issues that may be needed

due to proposed activities associated with relicensing should be included in the revised HPMP. Oregon SHPO expects to review the revised HPMP.

Response: In section 5.2.17 we note that PacifiCorp should revise its HPMP to encompass the geographic area of historic property management (in other words, the APE) as determined by Commission staff based on the provisions of a new license. In November 2006, we provided the Oregon SHPO with a copy of the March 2006 HPMP.

C-25 Comment: On pages 2-46, lines 36-39, and 5-5, lines 30-35, of the draft EIS, we modified PacifiCorp's proposed measure "…to specify revision and finalization of the project's HPMP for management of historic properties within the geographic area of historic property management for the project as determined by Commission staff and reflected in a new license." PacifiCorp (pp. 2-5 and 5-1) comments that it is not familiar with the terms used in the second half of this sentence and the statement is unclear. Is the "geographic area of historic property management for the project" not to be identified until the new license is issued? PacifiCorp asks us to clarify the text that we added, and asks us to specify the "geographic area of historic property management" in the EIS.

Response: Significant changes to project operations may result in changes in the nature and geographic extent of effects on historic properties from project operation under a new license. We use the term "geographic area of historic property management for the project" to mean the APE under a new license, to distinguish it from both PacifiCorp's proposed APE and the APE we use to determine effects of <u>all</u> the alternatives we consider in the relicensing process. Our EIS represents recommendations to the Commission, but action taken by the Commission in its order pertaining to this proceeding may be different from the recommendations reflected in the EIS and therefore cannot be predetermined.

C-26 Comment: On page 2-50 of the draft EIS, in our description of Staff Alternative measure 31S, we indicate that if the Commission determines Keno development to be non-jurisdictional, PacifiCorp should consult with the Oregon SHPO and other parties regarding treatment of historic properties within the APE. Oregon SHPO (p. 1) states that if Keno development remains in the project scope, it looks forward to consultation concerning the continuing treatment of this historic property.

Response: Commission staff thank the Oregon SHPO for this information.

C-27 Comment: Oregon SHPO originally recommended that PacifiCorp consult with tribes, the SHPOs, and appropriate land managers and sign a Memorandum of Agreement prior to capping any archaeological sites. On pages 5-53 and 5-54 of the draft EIS, we indicated that the Commission intends to execute a Programmatic Agreement with the California and Oregon SHPOs and there would be no need for a Memorandum of Agreement. Oregon SHPO (p. 4) agrees that with the execution of a Programmatic Agreement among PacifiCorp, the Commission, and the respective SHPOs, and inclusion in the Programmatic Agreement of a protocol that addresses procedures to be implemented when archaeological sites need to be capped; a Memorandum of Agreement would not be necessary.

Response: We revised the text to indicate that the Oregon SHPO agrees that execution of a Programmatic Agreement would make a Memorandum of Agreement for capping archaeological sites unnecessary.

DEVELOPMENTAL ANALYSIS

D-1 Comment: Interior (p. 90) states the power value used in table 4-1 of the draft EIS is overstated. In the draft EIS, we use a power value of 43.62 mills/kWh (on peak) and 34.20 mills/kWh (off-peak), including a capacity value, based on average of Mid-Columbia and California-Oregon border spot-market

prices, and cite PacifiCorp as the source. PacifiCorp, itself, argues strongly that this price significantly overstates the value of marginal changes in Klamath generation. In using these values, the draft EIS significantly exaggerates the true value of project power; and, by implication, the value of the waterway for producing electric power relative to other uses. The applicant's Form 1 filings with the Commission clearly demonstrate a history of purchasing power at substantially lower costs.

Interior (p. 91) comments that our reliance on spot prices in the draft EIS is very unusual. Interior's review of all the environmental impact statements prepared by Commission staff in the Pacific Northwest and California over the last 2 years have failed to uncover any other instance in which staff relied on a spot market price. Interior states PacifiCorp appears to share its view of the impropriety of using spot market prices to value marginal changes in project generation in its filing before the Public Utilities Commission of the State of California and states that "the value for the asserted incremental generation is seriously exaggerated." Rather, PacifiCorp asserts that the value is "at best, reflected by PacifiCorp's decremental generation cost." Interior agrees with PacifiCorp. That position, which is consistent with the Commission staff's long-standing objections to spot prices, should be adopted in the revised analysis.

Interior (pp. 91 and 92) states that perhaps the best measure of the current value of the next increment of power is what is currently being offered for sale. In the northwest, Bonneville Power Administration is the largest wholesale supplier and publishes those prices, which are commonly referenced by Commission staff as the source for replacement power in that region. Interior estimates that the average on-peak and off-peak value in the near future will be 33 mills/kWh, including a capacity value. However, the project is a highly unreliable source of power, and valuing it as high as the highly reliable power provided by Bonneville Power Administration is clearly an overstatement of its value. The project is no more reliable a source than an interruptible power source. Since interruptible power is valued with no capacity charge, it is appropriate to further reduce the 33 mills/kWh by PacifiCorp's estimate of it's marginal capacity cost of 9.3 mills/kWh, so that the upper bound of the value of project power is 23.7 mills/kWh.

PacifiCorp (p. 4-1) indicates that although in table 4-1 of the draft EIS we used the projected energy values for April 1, 2006, through March 31, 2007, provided by PacifiCorp in response to our AIR, PacifiCorp states that actual market values have been higher than this. PacifiCorp states that current values would be 53.60 mills/kWh on-peak and 38.73 mills/kWh off-peak.

Response: In developing our power value for use in the developmental analysis in the draft EIS, we reviewed PacifiCorp's 2005 Form 1 filing and, based on our assessment, PacifiCorp paid approximately $12 to $125/MWh for purchased power, with an average of about $57/MWh. The clear majority of prices were higher than the prices we used.

Commission staff often uses average market prices in EIS economic analyses. The statement that we used "spot prices" implies that we used higher than normal values. The energy rates we used are average values and, therefore, appropriate.

In its comment response, PacifiCorp also took exception to the Interior comment that the rates in the draft EIS that were too high, and provided updated rates, again an average of California-Oregon Border and Mid-Columbia rates. Those rates, as expected, were slightly higher than what we used in the draft EIS.

We still consider the rates that we used in the draft EIS to be reasonable and appropriate, but we recognize that such costs are highly variable over time, and that we should reflect current costs. Therefore, we use the updated costs from PacifiCorp in this EIS.

D-2 Comment: Interior (p. 92) states that because the generation losses that may result from both the mandatory and recommended mitigation supported by Interior are *di minimus* relative to total system

needs, reducing losses on the transmission and distribution system can result in the same amount of power reaching PacifiCorp's customers without the need for additional generation from any source. On older systems such as PacifiCorp's, substantial efficiency gains can be economically realized through the use of such advances as amorphous metal core transformers, which have zero No Load losses. Since the entirety of the power generated by the project could be replaced by improved transformers, the value of project power is equal to the additional cost of upgrading to the more efficient transformers – estimated to be 1.2 mills/kWh as the *least-cost* option – this is the appropriate value for power losses associated with required mitigation, since such losses are less than total project generation.

Response: Development of amorphous metal cores for distribution transformers is an emerging technology which will significantly reduce core losses to the electric grid. Such losses represent a very small percentage (<2%) of the total electrical consumption. Replacement of the generating capacity of the Project facilities solely through replacement of existing transformers with amorphous metal core distribution transformers would require widespread transformer replacement. Certainly, any efforts to reduce distribution losses on the electric grid which would help to reduce the need for new generation in the future. We expect that transmission and distribution companies, such as PacifiCorp's subsidiaries, would implement new, more efficient technologies in the future where cost effective. This may include replacement of transformers of older technology with new, more efficient transformers, such as amorphous metal core distribution transformers, over time as existing transformers are taken out of service at the end of their useful lives. However, we do not view this to be a near-term replacement source for project power if project facilities are decommissioned and the Commission typically does not direct licensees to use specific technologies to achieve maximum transmission efficiencies in a relicensing proceeding.

D-3 Comment: The Hoopa Valley Tribe (p. 35) and Klamath Tribes (p. 12) state that the assumption in table 4-1 of the draft EIS that a 30-year license would be issued is misleading, because it makes the costs of providing volitional fish passage or removing dams appear arbitrarily high. If the economic analysis assumed a 40- or 50-year license term, such costs would be lower and would appear more economically viable.

Response: Regardless of the expected license term, which can range from 30 to 50 years, the Commission uses a 30-year period of analysis for its economic analyses.

D-4 Comment: PacifiCorp (p. 4-1) does not agree with the assumption in table 4-1 of the draft EIS that the capacity rate is included in the energy value. Any entity with capacity-related obligations such as ancillary services, including PacifiCorp, must either self-provide these services through generation resources or purchase them from other generators. Any generator, including PacifiCorp, may choose to offer generation products bundled (firm energy with capacity) or unbundled (energy and ancillary service products as separate products). Valuing the project on the basis of market price for the energy component alone does not comprehensively capture the additional value of capacity. Reasonable approximations of capacity product values in the vicinity of the project could be freely obtained from the California ISO OASIS web page.

Response: We corrected table 4-1 to reflect that capacity value is not included in the energy rate. PacifiCorp may receive compensation for installed or dependable capacity and other ancillary services from the project facilities. The compensation would increase the overall value of the project.

D-5 Comment: PacifiCorp (p. 4-1) comments that table 4-1 of the draft EIS does not assign a value for Renewable Energy Credits. The Copco No. 1 and Iron Gate developments qualify for the California Renewable Portfolio Standard that begins in January 2007. The valuation of these credits could add

significant differentiation among the choices evaluated, as some scenarios include this value while others do not.

Response: Copco No. 1 and Iron Gate may qualify for the California Renewable Portfolio Standard, but we did not apply any value to the project in this EIS because we have no documentation for the valuation of these credits for these facilities. We included a note to this effect in table 4-1 of this EIS.

D-6 Comment: Quartz Valley Indian Reservation (p. 38), Karuk Tribe (p. 44), and Resighini Rancheria (p. 38) state that although the Commission does not have the authority to mandate what type of power would replace the project power if the project is decommissioned, the EIS should contain some discussion of the costs of various types of electrical generation. For example, the approximate cost of large-scale wind farms is $1,000/kW, with costs ranging from $30-60/MWh (CEC, 2006). The Staff Alternative with Mandatory Conditions would be substantially more expensive than wind power. There are nearby locations in proximity to transmission lines that are suitable for commercial-scale wind farm development, including the southern portion of the Shasta River Basin, north of the town of Weed. It would be a disservice to PacifiCorp's customers to add volitional fishways at the project when truly clean energy would be much cheaper. Laura Smith (p.2) and Klamath Basin Audubon Society (p. 2) comment that the draft EIS contains no provisions to protect rate paying customers from future increased power rates that would result from construction of fish ladders required by the resource agencies. With the fish ladders in place, the project would operate at a deficit that PacifiCorp would need to offset with higher power rates.

Response: We acknowledge that the potential exists for development of additional wind power facilities in the region, and those facilities may be cost-competitive with the project, especially after environmental measures are included.

D-7 Comment: Interior (p. 94) and the Water Board (p. 8) comment that documentation is not provided for the summary statistics in table 4-3 of the draft EIS. Interior asked Commission staff for working papers and studies upon which they relied. Although not asserting any information was of a proprietary nature or that the request would constitute a burden on the agency, and recognizing our complementary regulatory responsibilities in the same action, the Commission refused to provide any information, citing agency practice. The Water Board states that the information, assumptions, and analysis used to calculate the benefits shown in table 4-3 should be provided. Pacific Coast Federation of Fishermen's Associations et al. (pp. 25 and 26), Hoopa Valley Tribe (pp. 36-38), and Klamath Tribes (p. 12) also state that it is impossible for the tribes and other stakeholders to make intelligent comments on the draft EIS economic analysis when the Commission provides incomplete information on how it reached its economic conclusions. There is no indication of how Commission staff developed our annualized costs for environmental measures, our costs for dam removal, or our estimates of lost generation revenue associated with alternative flow regimes. Because the conclusions in the draft EIS are driven by economic analysis, the details of that analysis should not be kept a secret, and staff should provide all supporting material, assumptions, data, and methodologies that we used for its economic analysis. Oregon Fish & Wildlife (p. 26) comments that many of the preliminary 10(j) determinations in the draft EIS were based partially on Commission staff's estimate of the cost of implementing recommended measures. However, neither the 10(j) inconsistency letter nor the draft EIS explain how Commission staff arrived at cost estimates or provide any information or documentation to support the cost estimates. When cost is a significant determining factor in the analysis of the costs and benefits of recommended mitigation, the EIS must provide a clear justification for the costs and benefits.

Response: We consider the level of detail provided in appendix A, table A-1, to be adequate for presentation of costs of measures. The sources of our cost estimates are indicated in footnotes a, b, d, e, i, m, p, and z of table A-1. In most cases, the source of the costs from various PacifiCorp filings which we

reviewed and, in most cases, considered to be reasonable given the information available to us. In some instances, we did not agree with PacifiCorp's cost estimates, and developed our own costs for specific measures. Staff-derived costs are typically based on senior staff experience with implementing similar measures at similar projects.

D-8 Comment: Rather than being an assessment of the project's impacts on the environment and the mitigation necessary to address the adverse environmental impacts, Interior (p. 94) states that table 4-3 is an analysis only of the effect of mitigation on the profitability of the project. The table contains a line identified as "Annual net benefits." Since this calculation is simply the difference between the potential market value of the product and PacifiCorp's cost of production under certain circumstances, it is nothing more than "gross profit." Although "gross profits," using the Internal Revenue Service definition (which is computationally the same as the Commission definition of net benefits), is an appropriate input to help determine a taxpayer's taxable income, gross profits is not an appropriate basis for evaluating the extent to which net benefits would accrue to society as a result of a relicensing decision. The Commission's mandate is to balance power and non-power uses of the waterway for the benefit of society as a whole; including, but not limited to, PacifiCorp. Many of the resources impacted by a licensing decision are not bought and sold in the market place and their values would not be captured in a gross profits measure. However, the draft EIS' focus on the gross profitability of the project under various mitigation strategies ignores the opportunity costs of many of the resources involved. This may lead to decisions where the net benefits to society are not maximized and, in fact, does not provide an adequate basis for decision making. Oregon Fish & Wildlife (p. 26) comments that the costs for environmental measures analyzed in the draft EIS appeared to be purely based on the cost to PacifiCorp, while benefits for restored resources are not analyzed or considered.

Response: As stated in the Mead licensing decision (72 FERC ¶ 61,027, July 13, 1995), the basic purpose of the Commission's economic analysis is to provide a general estimate of the potential power benefits, cost of a project, and reasonable alternatives to project power. The analysis helps support an informed decision concerning what is in the public interest with respect to a proposed license. We analyzed the environmental benefits of potential environmental measures and project alternatives in section 3 of the draft EIS.

D-9 Comment: Interior (pp. 94 and 95) states that the proposed project operations would cause damages over the next license term, and mitigation measures would mitigate some of those damages. Accordingly, the costs associated with this mitigation become the cost necessary to reduce adverse environmental impacts. Thus the draft EIS conclusion (for example) to reject volitional fishways based on the "considerably higher cost" and its concomitant impact on project profitability is based on a very incomplete accounting of the net benefits associated with the project. The appropriate conclusion to draw from table 4-3, if properly calculated, is that the environmental damage resulting from project operations is extensive and costly to mitigate; and the contribution to power production is relatively low and considerably less than the cost of mitigating the damage.

Interior (p. 95) states that none of the entries in table 4-3 of the draft EIS address in any way the uncompensated consumption and destruction of the resources that are (or should be) the subject of the EIS for the relicensing of the project. Although Interior is not suggesting that it is necessary to place a monetary value on the resource losses, Interior believes that an "informed decision" cannot be made in the absence of a quantitative estimate of the resource consequences, albeit in a different metric from the gross profitability calculation. Similarly, the Hoopa Valley (pp. 33-36) and Klamath tribes (pp. 10 and 11) comment that the economic analysis in the draft EIS makes no effort to quantify the benefits of environmental measures and therefore presents a misleading picture of the actual costs and benefits of implementing them. The approach used in the draft EIS makes relicensing alternatives that include environmental measure less attractive than the No-Action Alternative, without considering the economic

benefits associated with improved water quality, lower fish disease, recovery of coho salmon, and increased anadromous fish production. This type of one-sided economic analysis violates NEPA standards and CEQA regulations that implement NEPA, because the draft EIS repeatedly rejects environmental measures as "not worth the cost" when the cost would be only to PacifiCorp. An EIS that is misleading, violates NEPA.

Margaret Draper (p. 2), Laura Smith (pp. 2 and 3), and North Group, Redwood Chapter, Sierra Club (p. 2) state that the draft EIS alternatives do not address the fact that the project dams have been harming the Klamath River system for almost a century and profits from project operations have gone to PacifiCorp. They do not consider PacifiCorp's restoration responsibilities to be properly addressed in the draft EIS. They conclude that a proper cost-benefit analysis should include the environmental costs of degraded water quality on human health and habitat, severely depleted cultural resources, loss of riparian habitat, and lost fisheries. Ms. Draper points out that the health benefits associated with salmon are becoming more widely known and contribute to market pressures that increase the value of these fish to society, the potential for overfishing, and the resultant potential loss of wild populations beyond the losses that are project-induced.

Response: See our response to the previous comment. We consider the costs associated with the environmental measures included in the Staff Alternative to be those necessary to protect and enhance resources affected by the project. Our rejection of some of the environmental measures recommended by others is not based solely on cost, but on our assessment of whether the environmental benefits that we conclude in our NEPA-required independent analysis warrant the expenditure of the indicated costs. We recognize that others have reached different conclusions regarding our assessments in the draft EIS, and the revised Staff Alternative in the EIS reflects our further analysis based on the information received in response to the draft EIS.

D-10 Comment: On pages 5-57 and 5-58 of the draft EIS, we state: "Although the potential benefits to commercial, recreational, and tribal fisheries of removing Iron Gate and Copco No. 1 dams are substantial, so are the costs." American Whitewater (pp. 7, 9, and 10) comments that the societal values of 30 to 50 years of restored salmon and steelhead runs and river reaches would far outweigh the cost of removal, likely by at least an order of magnitude, but the draft EIS never attempts this accounting. There is no evidence that the cost of removing all four main stem dams is not worth it. The Klamath River and its historical/potential salmon runs belong to the public and should be considered in our assessment. American Whitewater states that based on the record provided in the draft EIS, they support the Two Dam Removal Alternative, and believes this should be the preferred alternative.

Response: We agree that dam removal would result in societal benefits, although quantification of those net benefits would be difficult. We attempt to quantify some of those benefits and costs in section 3.3.8.2, *Socioeconomic Resources*, of the draft EIS using "best case, middle ground, and worst case" scenarios. We have adjusted our characterization of the potential benefits and costs of potential dam removals throughout the EIS by indicating that the benefits of dam removal are, in some cases, uncertain because of remaining issues that would need to be addressed in order to achieve "best case" outcomes, and no longer state or imply that dam removal would not be worth the associated cost.

D-11 Comment: Interior (p. 95), commenting on page 4-4, line 27, of the draft EIS, states that we should disclose the methodology, assumptions and complete results of the "independent conceptual evaluation of the potential costs" of dam removal in the EIS, and also include other estimates available in the record. PacifiCorp (pp. 4-1 and 4-2) states that our conceptual base costs for dam removal appear only to include actual structure removal costs, and not additional potentially substantive costs associated with studies, design, permitting, and potential sediment disposition or disposal. PacifiCorp comments that these costs need to be carefully evaluated and checked since they are essential metrics used in our

decisions regarding a preferred alternative. PacifiCorp also states that the lack of supporting detail makes it difficult to comment on the assumed cost of decommissioning Copco No. 1; however, PacifiCorp's experience with pending and proposed dam removals of much smaller facilities indicates that our estimated removal costs are too low.

Response: We reviewed cost estimates for other recent or planned dam removal projects (Condit Dam in Washington, Matilija Dam in California, and dams on the Lower Salmon River in Idaho), as well as the analyses performed by G&G Associates (2003) in developing our conceptual costs for dam removals. These values, along with material quantities estimated by staff, were used to compile our conceptual dam removal estimates. A more thorough analysis, using on-site information, would be necessary to develop final designs and refine cost estimates. We consider our conceptual estimates to be reasonable and appropriate for this type of analysis and comparison. We updated our cost estimates, where deemed necessary, using cost values provided in R.S. Means Heavy Construction Cost Data, 2007, 21st Ed. Our updated conceptual costs are presented in section 4.6, *Conceptual Costs of Dam Removal*, of the EIS.

D-12 Comment: In section 4.4 of the draft EIS, *Conceptual Costs of Project Dam Removal*, we estimate that the annualized cost of removing Iron Gate dam, including 116,000 MWh of lost generation, would likely be about $9,856,130, assuming that the sediments in the reservoir are not contaminated. The corresponding lost generation and reduction in project benefits from removing Copco No. 1 dam would be about 106,000 MWh and $4,501,650, assuming the sediments in the reservoir are not contaminated." American Whitewater (pp. 7, 9, and 10) comments that we should not include lost potential generation in the calculation of the cost of dam removal. PacifiCorp does not own that future generation revenue or have any specific right to it, and therefore it cannot be considered a loss to them. On the contrary, the Klamath River and its historical/potential salmon runs belong to the public and should be considered in our assessment.

Response: We consider it appropriate to include lost generation in the calculation of dam removal costs because PacifiCorp is authorized, through its license from the Commission, to operate and maintain the Klamath Hydroelectric Project and depend on the benefits it derives. The project is well maintained such that it is reasonable to expect dependable safe service for the foreseeable future, and PacifiCorp is following the regulations for relicensing the project and therefore has the legitimate expectation to continue to accrue the project benefits. In addition, PacifiCorp would continue to be obligated to provide power to its customers. Without project generation facilities, it would be forced to compensate by buying the power on the open market (at least in the short term), building new generating facilities, or entering into a power purchase agreement with a private developer for new facilities that the developer would build. Without an established replacement source, we consider the open market cost per megawatt-hour used in our analysis to be an acceptable proxy for replacement power.

D-13 Comment: The city of Yreka (p. 6) states that our conceptual costs for dam removal presented in section 4.6 of the draft EIS appear to be understated because they do not account for investments needed by other agencies for reconstruction of current facilities, such as the city's water transmission line that passes under Iron Gate reservoir, and highway bridges that were designed and installed under controlled, impounded river conditions. Also not considered in our conceptual dam removal estimates are the repair costs of future, recurring flood events on downstream facilities. These costs could be significant and could change the results of the cost-benefit analysis of dam removal.

Response: We have no definitive information to suggest that it would significantly impact the city of Yreka's buried water transmission line under Iron Gate reservoir or the abutments of existing bridges over the Klamath River where the reservoirs are currently located. Therefore, we did not include costs for repair or replacement of these facilities, but we acknowledge that it could be necessary in the future.

D-14 Comment: Conservation Groups (p. 17) state that table 4-4 in the draft EIS is incomplete and misleading because it compares the cost of dam removal to the No-Action Alternative, which could never be licensed. As a result, the power value is greatly exaggerated because it does not include any reductions that would result from conditions of a new license. They estimate that with mandatory conditions, there would be a 23 percent reduction in generation compared to historic levels. This comparison basis exaggerates the cost of dam removal, as well. The appropriate comparison for dam removal is the Staff Alternative with Mandatory Conditions in the opinion of the Conservation Groups.

Response: Comparison of alternatives to the "No Action" case is standard practice in Commission relicensing NEPA documents (EISs and EAs). The "No Action" case is almost never the preferred alternative, but it provides a common starting point for analysis and comparison.

D-15 Comment: Page 3-55, lines 46-47, of the draft EIS, states: "Regardless of whether reservoir sediments are contaminated, disposal sites for demolition material would be necessary." Conservation Groups (p. 9) comment that the EIS should reflect the findings of the California Coastal Conservancy Study, submitted after the draft EIS was issued, that disposal sites for demolition materials were identified in close proximity to each dam.

Response: The cost estimates for dam removal include the assumption that disposal sites for dam materials are available nearby.

D-16 Comment: PacifiCorp (p. 4-2), commenting on the discussion of potential removal of the Copco No. 1 development (section 4.6.3 of the draft EIS) is uncertain what we mean when we say we assume it would be feasible to restore the existing dam drain gates. Original construction drawings show waste tunnels through the dam about 15 feet above the original river channel that passed water during construction, which have since been filled with concrete. The original drawings also show a gated diversion tunnel through the left bank that bypassed water around the dam site during construction. The gated diversion tunnel was plugged with concrete, the gate house that controlled the gate is no longer in existence, and the conditions of the gates (if they still exist) and the tunnel are unknown. Restoring the diversion tunnel would require removing the concrete plug and establishing flow control to provide for controlled release of the reservoir. Flow control would need to be established either at the submerged tunnel inlet or at the tunnel outlet. Since the diversion tunnel was never operated under head, the tunnel may require lining to prevent erosion of the tunnel that could affect the stability of the left abutment. Detailed engineering studies would be needed to determine the best method for establishing a low-level outlet that could drain the reservoir in a controlled manner, dissipate the energy from the water so that it does not threaten the stability of the dam, and handle the expected sediment load.

Response: We assumed in our dam removal estimates in section 4.6.3 of the draft EIS that the existing dam drainage tunnel and headworks at Copco No. 1 could be refurbished for use in making a controlled drawdown of the reservoir. We acknowledge that additional studies and investigations would be warranted if the removal of the dam is required, in order to determine the feasibility of those refurbishments and safety of those operations. Given that those studies and investigations may determine that an alternative method of lowering the reservoir may be required, we increased our contingency factor from 25 percent to 50 percent for Copco No. 1.

D-17 Comment: PacifiCorp (p. 4-2) comments that if Copco No. 1 dam is removed and Copco No. 2 left in place, modifications to Copco No. 2 would be needed to pass the sediment discharged from Copco No. 1. This modification would likely consist of slide gates that could pass sediment to the Copco No. 2 bypassed reach.

Response: It is our assumption that the existing Taintor gates at Copco No. 2 dam would be adequate to pass sediments without need for replacement with another style of gate. PacifiCorp did not present any supporting information regarding their implication that slide gates would be required.

D-18 Comment: The Water Board (p. 3) states that if Copco No. 1 dam is removed, large amounts of sediment are likely to be washed downstream to Copco No. 2 reservoir. This sediment would need to either be flushed downstream or mechanically removed before the dam can divert flow to the power tunnel. The Water Board comments that this impact is not discussed in the draft EIS. Pacific Coast Federation of Fishermen's Associations et al. (pp. 18 and 51) also states that if Copco No. 1 dam is removed, Copco No. 2 reservoir would quickly fill with sediment and this scenario should now logically be compared to a four dam removal alternative.

Response: We discuss the downstream transport of sediment following Copco No. 1 dam removal in section 3.3.1.2.6, *Development Decommissioning and Dam Removal*, on pages 3-56 and 3-57 of the draft EIS and also in section 3.3.1.3, *Cumulative Effects* (page 3-38). We added information to section 3.3.2.2.2, *Water Quality*, of this EIS to reflect information reported by GEC (2006) that about 84 percent of the sediment eroded during and following dam removal would remain in suspension until it reaches the ocean. We also include their predicted concentrations and durations of elevated levels of TSS in the lower Klamath River following the removal of Copco No. 1 and Iron Gate dams both sequentially and concurrently. All indications are that during and after dam removal most of the sediment would pass through Copco No. 2 reservoir. As we indicate in our previous comment response, we consider the existing Taintor gates to be capable of passing sediments downstream during and after removal of Copco No. 1 dam. It is uncertain whether any dredging of Copco No. 2 reservoir in proximity to the powerhouse intake would be necessary to facilitate flows to the powerhouse, but given that most of the sediments in Copco reservoir are silt and clay, we expect that little deposition would occur and we consider the need for dredging to be unlikely. There is no reason why the potential for sediment deposition in Copco No. 2 reservoir should have a bearing on which dam removal alternatives are considered in this EIS.

D-19 Comment: Friends of Del Norte (pp. 6-13) comment that compared to the environmental benefits that we ascribe to a two dam removal alternative, removal of four dams would result in even greater benefits to water quality, anadromous fish restoration, fish disease management, reestablishment of vegetation diversity along riparian corridors, recreational fishing opportunities within the coastal zone all the way to San Francisco Bay, and resources of importance to Native Americans. Our draft EIS text on the effects of two dam removal on anadromous fish restoration (section 3.3.3.2.4) is used to support the Friends of Del Norte's position that dam removal is the most beneficial alternative.

Response: The incremental benefits of removing four mainstem dams compared to two mainstem dams on water quality, anadromous fish restoration, fish disease management, reestablishment of vegetation diversity along riparian corridors, coastal recreational fishing opportunities, and resources of importance to Native Americans would be relatively minor. Copco No. 2 reservoir is relatively small, and therefore has little influence on water quality and subsequent factors believed to foster fish diseases, effective technology exists to facilitate upstream and downstream fish passage over the 33-feet-high dam (although there would be some expected upstream passage delays at a fish ladder and some downstream passage inefficiencies, which would occur at any screen and fish bypass system), and we would expect little if any change to recreational fisheries or resources of importance to Native Americans if Copco No. 2 dam remains or is removed. J.C. Boyle reservoir does not stratify and water entering the reservoir has a very short residence time. Consequently removal of J.C. Boyle dam would not have a substantial influence on downstream water quality, other than to substantially dilute the cool water refugia that currently exists in the J.C. Boyle bypassed reach, which could diminish habitat quality for some anadromous salmonids. If Copco No. 1 and Iron Gate dams are removed, the J.C. Boyle development would need to operate in a run-of-river mode, thus downstream riparian corridors would be similar with and without J.C. Boyle in

place. As mentioned for Copco No. 2 dam, there would be some upstream and downstream fish passage inefficiencies associated with existing and potential future fishways at J.C. Boyle dam, as is the case at any dam with fishways, and removing the dam would eliminate any such inefficiencies. Our revised Staff Alternative in this EIS is designed to address in a feasible manner many of the benefits that could also be associated with mainstem dam removal. We summarize the environmental costs and benefits of two and four dam removal in section 5.2.2.1 of this EIS.

D-20 Comment: Interior (p. 38) states that Keno dam should remain part of any new license issued for the project because power generation downstream of Keno dam will be dependent on the operation of, and use of water from, Link River and Keno dams. Water stored behind and released from Link River dam, a Reclamation facility currently operated by PacifiCorp under contract with the United States, flows past Keno dam to be delivered downstream through the power project. This water is essential for the operation of the project.

Response: Link River dam is not part of the Klamath Hydroelectric Project and therefore the Commission has no jurisdiction over how Reclamation chooses to operate it. Similarly, although at one time Keno dam may have been operated to re-regulate flows released from East Side and West Side developments, it now is operated to maintain relatively stable water levels in Keno reservoir to benefit irrigators and other consumptive water users that withdraw water from this reservoir, as discussed in section 4.7 of the draft EIS. Just because water passes by dams on its way to project hydroelectric developments, does not make these developments dependent on the upstream dams. They are dependent on the water in the river and gravity, not the dams.

D-21 Comment: Interior (pp.39, 81, and 82) states that recreation lands at Keno dam are a part of the project, and reside on lands under the jurisdiction of Reclamation and the potential loss of Keno Recreation Area recreation facilities and reservoir access are problematic. Section 10(a)(1) of the FPA includes "*other beneficial public uses, including irrigation, flood control, water supply, and recreational and other purposes*" as public purposes of a licensed project, and a licensee's obligations, under its license, may extend to the furtherance of these purposes just as they extend to operation of the project for water power development. Limited public boating access and boat trailer parking is available at Veteran's Park in Klamath Falls, and at Miller Island. No other public camping opportunities are available along Keno reservoir. The loss of these day use and camping facilities at Keno Recreation Area may shift considerable use to J.C. Boyle reservoir and other nearby areas. This potential loss of boater access and developed facilities and its effects on other project recreation facilities, (i.e., Topsy Campground) and use needs to be addressed within the EIS. There is no assurance that Keno Recreation Area would be operated by PacifiCorp or any other entity if the development is removed from the project boundary. Oregon Parks & Rec (pp. 2 and 3) makes a similar comment, stating that without thoroughly examining the effects of removing the Keno Recreation Area from the project boundary, the Commission cannot make an informed decision regarding PacifiCorp's proposal to exclude Keno development from the new license. We should conduct a cost/benefit analysis of removal of the Keno development from the project boundary including both the environmental and socio-economic consequences to the users and community. The Staff Alternative should include an operation and maintenance plan and funding for continued operation of this site. Oregon Parks & Rec and Interior both conclude that it is appropriate to include within the project boundary Keno dam, and those lands necessary for such project purposes served by Keno dam.

Response: Our decision to retain Keno development in the project is based on a jurisdictional determination (does Keno development serve project purposes?) not environmental or economic issues. If the Commission agrees that Keno development no longer serves project purposes, it could not longer ensure the continued operation and maintenance of the Keno Recreation Area. We recommend substantial enhancements at the downstream J.C. Boyle development which should be able to meet any

displaced day-use or camping opportunities should the Keno Recreation Area no longer be available as a public recreational facility.

D-22 Comment: Interior (p. 39-40), NMFS (p. 47), Oregon Fish & Wildlife (p. 233), Klamath Riverkeeper et al. (pp. 4 and 5), Pacific Coast Federation of Fishermen's Associations et al. (pp. 33-35 and 69-70), North Group, Redwood Chapter, Sierra Club (p. 2), and Conservation Groups (pp. 9, 10, 18, and 19) state the draft EIS has not analyzed the environmental consequences of the proposed removal of Keno dam from the project, and that removing Keno dam from the license relieves PacifiCorp of its responsibility to address critical issues regarding Keno dam and its effect on the Klamath River. If the Commission decides to remove Keno dam from the project, then the new license should be conditioned to address the necessary issues regarding Keno and PacifiCorp's obligations to properly remove it from the project. They comment that all alternatives in the draft EIS include removing Keno dam from the project license, however; no analysis of environmental, social, economic, political, or technological consequences have been conducted. NMFS comments that absolutely no benefit would accrue to the public's trust resources if Keno dam were removed from the new license without any environmental measures to mitigate its impacts. Allowing Keno dam to be removed from a new license does not serve the public interest, and constitutes a relinquishment of the Commission's jurisdictional authority. This would have the effect of transferring PacifiCorp's environmental and public safety liability to the public.

Conservation Groups add that, because the No-action Alternative would leave Keno development within the project, the EIS should outline the consequences of both inclusion and exclusion of the development and fully disclose the analysis behind its decision to exclude Keno development. Post-licensing impacts from Keno development if excluded from the project must be disclosed and evaluated in the EIS in accordance with the requirements of NEPA. KWUA (pp. 3 and 4), Humboldt County (p. 3), the Hoopa Valley Tribe (p. 47), and Klamath Tribes (p. 14) state that the draft EIS fails to adequately evaluate the environmental impacts associated with removing Keno development from the project. The Hoopa Valley Tribe objects to removal of Keno development from the project, and the tribes state that the EIS should provide the Commission and the public with a fair analysis of the impacts associated with removing this development from the project. KWUA states that the draft EIS fails to even mention the substantial role that Keno dam plays with respect to project purposes other than downstream generation. The Commission should recognize PacifiCorp's attempt to eliminate Keno from the project as an attempt to gerrymander the project boundary to exclude Interior from imposing mandatory 4(e) conditions on lands associated with the Keno development.

Response: Our assessment of whether Keno development should remain within the project is based on our analysis of whether it currently serves project purposes or would do so in the future. Our analysis in section 4.7 of the EIS indicates that Keno development is operated to maintain stable water surface elevations in the reservoir, which benefits other water users, and is not operated to enhance downstream power generation. If the Commission concurs with this conclusion, Keno development would not be within the Commission's jurisdiction. The conclusion regarding whether Keno development should remain in the project is a jurisdictional not an environmental determination. If determined to be non-jurisdictional, the transfer of jurisdiction from the Commission to Oregon agencies charged with overseeing dams (i.e., Oregon Fish & Wildlife and Oregon Department of Water Resources) would be handled administratively, without a formal decommissioning plan. The owner of Keno dam would be subject to environmental conditions that may be imposed by the jurisdictional agencies.

D-23 Comment: Rogue Flyfishers (p. 3) states that Keno dam should be included as part of the project even if it no longer generates electricity so that fish passage or removal conditions can be imposed. Failure to include Keno dam in the new license should be analyzed in the EIS so that impacts of not addressing the fish passage issue at the dam are analyzed.

Response: As indicated in the previous response, the decision to remove or retain Keno development in a new license for the project is a jurisdictional not an environmental decision. If the Commission concurs with our conclusion that Keno development no longer serves project purposes, imposing conditions that pertain to long-term fish passage would not be appropriate. Oregon resource agencies would be responsible for ensuring the continued safe and effective operation and maintenance of the dam, including the existing fish ladder. The existing reservoir is used by many irrigators and other water users and supports the existing Klamath Wildlife Area, managed by Oregon Fish & Wildlife. We do not recommend its removal.

D-24 Comment: Oregon Fish & Wildlife (p. 232) agrees with most of the environmental measures that the Staff Alternative recommends on page 5-55 of the draft EIS in the event that Keno dam remains within the new license. However, it believes that these measures should all be required even if Keno dam is not included in the new license, because the identified impacts of Keno dam would be continuing and should be addressed as would be required under a decommissioning proceeding.

Response: As indicated in previous comment responses, the decision to remove or retain Keno development in a new license is a jurisdictional, not an environmental decision. We indicate in section 4.7 of the EIS that the primary benefit of the dam, as it is currently operated, is to water users that rely on water in Keno reservoir. Those water users may be potential candidates to operate the dam in an environmentally responsible manner in the future. The jurisdictional agencies would have the ability to enforce conditions that ensure responsible future operation of Keno dam.

D-25 Comment: Section 2.2.2 (*Proposed Project Operations*) of the draft EIS states: "The proposed project also would not include Keno development, but Keno dam would continue to be operated as it is currently, only under the jurisdiction of the state of Oregon." Interior (p. 66) states that the EIS should reflect that the operation of Keno dam is predominantly controlled by the contract between PacifiCorp and Reclamation and that the contract term is coincident with the existence of the project. Additionally, section 2.2.2 assumes that the amount and timing of water available at J.C. Boyle, Copco Nos. 1 and 2, and Iron Gate developments would be "similar" to that under "existing" hydrologic conditions, because PacifiCorp does not propose any new storage and no storage facilities are being removed. This may not be the case because PacifiCorp may not continue to operate Link River dam or Link River dam may not be operated in favor of power generation in the future. Interior also states that there is no assurance that the Keno facilities would continue to be operated as they are currently. The TMDL and regulations by the state of Oregon could require changes.

Response: We indicate in section 2.1.1.2 of the draft EIS that PacifiCorp currently operates Keno dam under an agreement with Reclamation. This agreement is primarily intended to ensure water levels in the reservoir are maintained at sufficient levels to enable Reclamation's gravity fed irrigation canals to function properly. We agree that although it is likely that Keno dam operation would be similar in the future, provisions in the TMDL or directives from the state of Oregon could result in alternative dam operations. We modified section 2.2.2 of this EIS to reflect this possibility. However, applicable Biological Opinions from NMFS and FWS would ensure that releases from Keno dam meet downstream flow needs.

D-26 Comment: PacifiCorp (p. 4-2), commenting on page 4-21, line 14, of our discussion of greenhouse gas emissions, states that: "PacifiCorp does not own the Klamath Cogeneration Project. This facility is owned by PPM Energy, Inc., which was retained by Scottish Power in the recent PacifiCorp transaction."

Response: We revised the appropriate text in section 4 of the EIS to reflect this information.

D-27 Comment: Table 4-7 provides estimated carbon emissions displacements from each of the project powerhouses. The Water Board (p. 9) states that the information used to estimate the quantity of carbon emissions should be provided.

Response: We revised the text to provide more documentation for the methods used to estimate carbon emissions.

D-28 Comment: Energy and Resource Advocates (p. 4) state that the comparison of greenhouse gas emissions that would be displaced at each of the project developments is incomplete because it does not include any discussion of solar electric generation or wind generation. This information is readily available on the U.S. Department of Energy website.

Response: We are not aware of any viable solar electric generation sites in the vicinity of the project that could be used to replace project power. PacifiCorp is currently considering the installation of 1,400 MW of wind power to its system over the next 10 years, based on its current load forecasts. However, any capacity removed from the system accelerates the year of need for new facilities. We cannot predict with certainty how any lost power from the project would be replaced, but the most likely source of new generation would be from a natural gas generating station.

D-29 Comment: Quartz Valley Indian Reservation (pp. 19 and 20), Karuk Tribe (pp. 27 and 28), and Resighini Rancheria (pp. 19 and 20) indicate that the carbon intensity factor that we used to estimate the amount of greenhouse gas that the project would displace, 155 kgC/MWh, assumes the electricity would be replaced by an old, inefficient natural gas power plant, although no reference is provided regarding the origin of the number. It is more likely that the electricity would be replaced by a large-scale, new, efficient combined cycle natural gas power plant, and according to the EPA, the carbon intensity factor for such a plant would be 101 kgC/MWh. Using this alternative carbon intensity factor, the Quartz Valley Indian Reservation, Karuk Tribe, and Resighini Rancheria estimate that the project displaces 72,397 metric tons of carbon per year, rather than the approximately 111,000 metric tons shown in table 4-7 of the draft EIS.

Response: The 155 kgC/MWh carbon intensity factor used in the draft EIS is a composite value based on the WECC region as a whole, given the varying carbon intensity factors attributable to various types of facilities and fuel sources within the region. We acknowledge that new, efficient combined cycle gas plants have carbon intensity factors in the range of 100 kgC/MWh. We revised table 4-7 in this EIS to show the emissions estimates using both carbon intensity factors to reflect the range of carbon emissions potentially displaced by the Klamath Hydroelectric Project.

D-30 Comment: Quartz Valley Indian Reservation (pp. 20-23), Karuk Tribe (pp. 28-30), and Resighini Rancheria (pp. 20-23) state that although we acknowledge on page 3-149 of the draft EIS that project reservoirs produce methane, a greenhouse gas, we do not offset our estimated carbon displacement effect shown in table 4-7 of the draft EIS by the methane produced by project reservoirs. Klamath Riverkeeper et al. (p. 16) comments that our greenhouse gas discussion neglects to mention that project reservoirs emit methane, despite strong evidence that this is the case. Quartz Valley Indian Reservation, Karuk Tribe, and Resighini Rancheria use a study of lakes with similar phosphorus concentrations as project reservoirs (Bastviken et al., 2004) to predict that the methane produced by project reservoirs is equivalent to 3 to 12 percent of the project's carbon displacement, and suggests that we use the regression equations in this publication to develop a more precise estimate of project-related methane production and include this offset to carbon emission reductions in the final EIS. The Water Board (p. 9) notes that the project reservoirs are known to produce methane, a greenhouse gas. Although the amount of methane produced is not known, the EIS should disclose the impacts of methane production, and the benefits of reduced methane production that would occur under the various dam removal alternatives. Klamath Riverkeeper

et al. (p. 16) similarly state that our assessment of greenhouse gas displacement should factor in the estimated 3 to 12 percent that displacement would be reduced by project-related methane production. Joyce King (p. 2) states that our draft EIS does not seem to account for the contributions to global warming from increased water temperatures, decreased riparian vegetation, methane and other sources exacerbated by the reservoirs and stream channel changes. She states that there is evidence that the large historic salmon returns contributed significantly to the fertility of forest soils and ultimately, carbon sequestration.

Response: We acknowledge that at least some project reservoirs (i.e., Copco and Iron Gate) may at times serve as sources of methane, which is produced as the final step in the anaerobic decay of organic matter, and which could theoretically offset some project-related carbon emission displacement. However, recent research indicates that methane is also produced by terrestrial plants (Keppler, et al., 2006), in addition to its well known production by livestock and wetlands, so that the area occupied by the reservoirs would likely produce methane whether or not the dams are present. We also note that algae and vascular aquatic plants in the reservoir are a sink for another greenhouse gas (carbon dioxide). Given the lack of any site specific data concerning methane production at the Klamath Hydroelectric Project, any attempt to estimate net bio-production of greenhouse gases would be speculative, at best. Conversely, the displacement of carbon emissions by project generation is well understood and calculable. We added text to section 4.8, *Greenhouse Gas Emissions*, to recognize alternative biological sources and sinks of greenhouse gases.

D-31 Comment: Quartz Valley Indian Reservation (p. 20) and Resighini Rancheria (p. 20) state that an independent agency such as the Commission or the California Energy Commission, should review and confirm the accuracy of PacifiCorp's calculations of average annual energy generation and the results of this independent audit should be included in the EIS.

Response: The PacifiCorp values are based on long-term generation records which are filed with the Commission. We accept them as accurate.

D-32 Comment: Quartz Valley Indian Reservation (p. 39), Karuk Tribe, and Resighini Rancheria (p. 39) state that table 5-1 in the draft EIS, summarizing the effects of the four action alternatives, should be revised to show how the various alternatives affect greenhouse gas emissions, including carbon dioxide from replacement power and methane from project reservoirs.

Response: We have included carbon dioxide reduction estimates have been added to tables 4-3 and 5-1. As stated in our response above regarding methane production in project reservoirs, we cannot currently quantify the amount of methane produced in each reservoir, but we will add a note acknowledging that the draining of project reservoirs as part of any dam removal efforts would reduce methane production.

D-33 Comment: PacifiCorp (p. 5-20) indicates that the annualized cost to develop a water quality resource management plan, shown as $2 for item 16 in table 5-2, does not seem accurate.

Response: We corrected the incorrect cost in table 5-2. The correct cost, $106,200, is shown in appendix A, table A-1, of the draft EIS (Water Quality Measure 1).

D-34 Comment: PacifiCorp (p. 5-20) states that the annualized cost to notify agencies prior to scheduled maintenance of upstream or downstream fish passage facilities shown for item 49 of table 5-2 ($0, since such notification already occurs) would increase because more fish passage facilities would be present.

Response: We consider this measure to be primarily administrative in nature, accomplished by either email or letter and would not substantively increase costs.

D-35 Comment: PacifiCorp (p. 5-20) states that the annualized cost to construct, operate, maintain, and evaluate a fish screen at J.C. Boyle dam shown for item 52 of table 5-2 ($5 million) is too low based on previous estimates.

Response: The costs for this measure were based on CH2M Hill's estimate for capital costs and O&M and adjusted based on the year of implementation (PacifiCorp, 2006a, Attachment E, p. E-40). The cost provided in table 5-2 is the annualized cost of the measure.