



United States Department of the Interior

FISH AND WILDLIFE SERVICE

California/Nevada Operations Office
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Sacramento, California 95825-1846



December 1, 2006

Honorable Magalie R. Salas
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, D.C. 20426

Re: **Comments** – Review of Draft Environmental Impact Statement for the Klamath River – Hydroelectric Project, FERC Project No. 2082, Klamath River, Klamath County, Oregon, and Siskiyou County, California

Dear Ms. Salas:

The Department of the Interior (Department) has reviewed the Draft Environmental Impact Statement (DEIS) for the Klamath Hydroelectric Project (FERC No. 2082) (Project), located primarily on the Klamath River in Klamath County, Oregon, and Siskiyou County, California, between Klamath Falls, Oregon, and Yreka, California. Through its issuance of the DEIS, the Commission requested that comments on the document be submitted to the Commission by November 24, 2006. On November 2, 2006, staff of the Federal Energy Regulatory Commission (Commission or FERC) approved an extension of the response deadline to December 1, 2006. While the Department's specific comments are provided as an enclosure to this letter, I provide here an outline of the Department's request that the Commission conduct a Supplemental Draft Environmental Analysis (SDEA), to address a number of issues listed here and described more fully in the enclosure.

The Department and its bureaus (the Bureau of Indian Affairs (BIA), Bureau of Land Management (BLM), Bureau of Reclamation (Reclamation), National Park Service (NPS), and Fish and Wildlife Service (Service or FWS)) have provided technical assistance and participated on technical subgroups with the Applicant since 2001. The Department also provided the Applicant with comments and recommendations on its Draft License Application (DLA) on September 24, 2003, the Final License Application (FLA) on April 26, 2004, and in many other letters filed with the Commission and hereby incorporated by reference. The Department formally intervened in the proceeding on September 29, 2004. On March 27, 2006, the Department provided comments, recommendations, terms and conditions, preliminary prescriptions for fishways, and mandatory conditions in response to the Commission's Ready for Environmental Analysis notice.

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Need for a Supplemental Draft Environmental Impact Statement

Pursuant to our review, the Department finds that there are a number of deficiencies in the DEIS analysis and significant new information now available that is relevant to the environmental issues raised by the application. Accordingly, to ensure the Commission's full compliance with the National Environmental Policy Act (NEPA), the Department recommends that the Commission issue a Supplemental DEIS (SDEIS) for further public review prior to issuing the Final EIS (FEIS) and licensing decision. The outline below lists the primary reasons for the Department's request; each of these is discussed more thoroughly throughout the Department's comments:

- 1. New Information:** The DEIS was issued on September 25, 2006, and thus it does not include the findings of fact related to disputed issues of material fact that were issued on September 27, 2006, in the Klamath Project Energy Policy Act hearing.¹ The Administrative Law Judge (ALJ) in that case was presented with a number of the same factual issues and representations upon which FERC relied in its DEIS. The ALJ's decision on those issues is thus a critical and necessary element that must be incorporated into FERC's analysis. Without the inclusion and full consideration of these facts and the scientific evidence on which they are based, the DEIS is an incomplete picture of the issues and impacts.²

Substantial evidence was also provided in the Department's March 27, 2006, filing in response to the Commission's Ready for Environmental Analysis notice, and many of the references so submitted (including Anglin et al. 2005, Annear et al. 2004, Buchanan et al. 1990 and 1994, and Hemingsen 1997) were not included in the Commission DEIS analysis. In addition, we also are submitting additional information here, including technical memoranda from Dr. Mark Gard (Gard 2006), FWS; Dr. Stacy Li (Li 2006), National Marine Fisheries Service; and Dr. George Robison (Robison 2006), Oregon Department of Fish and Wildlife; as well as supporting hydrologic data analysis from BLM and Reclamation. Again, to ensure that the environmental analysis for this project is complete, this "new" information must be included in the SDEIS. References to this material are included in the general and specific comments in the enclosure.

- 2. Staff Alternative:** The Staff Alternative fails to specify actions to avoid or mitigate the Project impacts in blocking the movement of resident and anadromous fish. Instead the Staff Alternative relies on an incomplete and undeveloped plan to evaluate potential actions for unspecified fish, in one unspecified river segment, without any certainty that such a plan would mitigate Project impacts or achieve agency restoration goals. Since decisions are deferred, and the details of the fish passage

¹ The expedited trial-type proceeding was brought pursuant to Section 241 of the Energy Policy Act of 2005 (EPAAct), Pub. L. 109-58, § 241, 119 Stat. 594, 674-75 (Aug. 8, 2005) (codified in 16 U.S.C. §§ 797(e) and 811), and the underlying procedural regulations codified in 50 C.F.R. Part 221. Section 241 amends sections 4(e) and 18 of the Federal Power Act ("FPA") (amended and codified in 16 U.S.C. §§ 791-823d).

² The complete record of the hearing, Klamath Hydroelectric Project, Docket No. 2006-NMFS-0001, has been filed with FERC in the docket for Project No. 2082. Some of these documents can also be accessed at <http://www.fws.gov/yreka/P2082>.

program are not described, the DEIS fails to disclose the resource impacts of the alternative as required by NEPA. To ensure compliance with NEPA, the Commission must provide a more fully developed Staff Alternative in the SDEIS, and fully disclose the impacts of that alternative.

- 3. Range of Alternatives:** The DEIS does include a broad range of alternatives, from no action to the decommissioning of two mainstem dams. However, it fails to analyze the several alternatives to agency conditions that were submitted to the Department pursuant to the Energy Policy Act by PacifiCorp, the California Department of Fish and Game, and the State of Oregon. These alternatives must be analyzed in the SDEIS.

In addition, none of the analyzed DEIS alternatives include the retention of the Keno Dam within the Project boundary. The Department has advocated, and continues to advocate, the retention of the Keno Facility within the Klamath Project. The Commission has chosen not to analyze this scenario, and as a result, the impacts of the Commission's potential agency action to exclude the currently licensed facility are not analyzed and disclosed in the DEIS. Accordingly, the SDEIS must include full analysis of the impacts of removing Keno Dam from Commission jurisdiction.

- 4. Scope of Analysis:** The geographic scope has been applied inconsistently. For example, with respect to anadromous fish, the stated scope of the DEIS is the Klamath River and all habitat that was historically accessible upstream from the mouth of the river; however, the analysis of the reduced resource losses due to restored fish access is limited to habitat between Iron Gate Dam and J.C. Boyle Dam. This inconsistency is inexplicable. The Commission must consistently analyze the costs and benefits of the application, and not limit that analysis in ways that may skew the results. The full scope of the project, and its concomitant costs and benefits, must be analyzed in the SDEIS.

The temporal scope of the DEIS is also inconsistently applied. The scope is stated as 30 to 50 years on Pages 3-4, the developmental analysis is based entirely on a 30 year license term, and the discussion of Project impacts does not differentiate between 30 and 50 years. We recommend that the Commission consistently disclose impacts over a 30 year period.

In addition, the DEIS does not include analysis considering relicensing and potential license conditions from a perspective of the general public interest. Instead of assessing the ongoing resource impacts from Project operations, and the extent to which proscribed and recommended mitigation would reduce those impacts, FERC measures the impact of the mitigation only on the pre-tax profitability of the Project. The DEIS contains no quantification of the ongoing resource impacts resulting from the operation of the Project and therefore provides no basis from which it can properly assess the effectiveness of alternative mitigation strategies in reducing those impacts.

5. **Tribal Trust:** Although the Commission acknowledges that, as an independent agency of the federal government, it has a trust responsibility to Indian Tribes (see 18 C.F.R. Part 2.1(c)), the DEIS contains no analysis of the impacts of each of the alternatives on Indian Tribes or Indian trust resources. To fulfill its trust responsibility to Indian Tribes, the Commission must fully describe the tribal resources and the project's impacts to those resources, and analyze how each proposed alternative would impact those resources. The DEIS fails to meet this obligation; the SDEIS must include such an analysis to ensure that the Commission meets its trust obligations to Indian Tribes.

The Department would also like to inform the Commission of concurrent developments affecting the Klamath Project under the Wild and Scenic Rivers Act, and the Endangered Species Act.

Wild and Scenic Rivers Act

The NPS and the United States Department of Agriculture (USDA) Forest Service have jointly developed (and are filing under separate cover) a preliminary determination of the effects on the segments of the river below Iron Gate Dam that are part of the National Wild and Scenic Rivers System. The BLM will issue its preliminary determination regarding the designated segment of the river below J.C. Boyle Dam along with its modified conditions, 60 days after the close of the NEPA comment period.

Endangered Species Act

On November 3, 2006, the Service responded to the Commission's written request for consultation under Section 7 of the Endangered Species Act. In this letter, the Service stated its determination that insufficient information has been provided to initiate formal consultation because the proposed action for the license is not fully developed or described at this time. To develop sufficient information, the Service suggests a cooperative approach involving the Commission staff, the Services, and the Applicant to ensure that a license decision is not delayed during formal consultation, and that the final Biological Opinion is based upon the best available scientific and commercial information and accurately reflects the decision that will be reflected in the new license. The Service also notes that the Project is currently being operated without having undergone ESA Section 7 consultation. We suggest that the Commission consult with the Service on the annual license until such time that a new license is in effect.

In addition, please note that Reclamation has declared its intent to reinstate consultation with National Oceanic Atmospheric Agency (NOAA) Fisheries and Fish and Wildlife Service on Klamath Reclamation Project operations. It is expected that there will be changes, such as a change in the control point for downstream flow requirements that may affect Project No. 2082, and that any such changes will need to be recognized and reflected by the Commission.

The Department expects that the Commission will fully address and analyze the comments and new issues raised throughout our comments. We recommend that this can best be done through preparation of a SDEIS. In order for FERC to fully comply with

NEPA, the document must ensure that all direct, indirect, and cumulative impacts to fish and wildlife and their habitats, trust resources, and other resources affected by impacts resulting from the continued construction, operation, and maintenance of the Project are fully addressed.

The Department appreciates the opportunity to provide comments on the DEIS for the proposed relicensing of the Klamath River Hydroelectric Project, Project No. 2082. If you have questions regarding the enclosed comments, please contact David Diamond at (530) 842-5763.

Sincerely,

A handwritten signature in black ink that reads "Steve Thompson". The signature is written in a cursive, flowing style.

Steve Thompson
Manager

Enclosure
Comments of the Department of Interior
in Response to the Federal Energy Regulatory Commission’s
Draft Environmental Impact Statement
for the Klamath River Hydroelectric Project,
FERC Project No. 2082, Klamath River,
Klamath County, Oregon, and Siskiyou County, California

GENERAL COMMENTS.....	1
DEIS Staff Conclusions.....	1
5.2.1 Flushing Flows and Gravel Management	1
5.2.2 Restoration of Slopes and the Channel at the J.C. Boyle Bypassed reach	11
5.2.3 Project Operations	12
5.2.4 Water Quality Management.....	12
5.2.5 Instream Flows	13
5.2.6 Anadromous Fish Restoration	15
5.2.7 Fish Disease Management	23
5.2.8 Resident Fish Passage	26
5.2.9 Hatchery Management	29
5.2.10 Aquatic Habitat Enhancement.....	31
5.2.11 Aquatic Resource Monitoring.....	32
5.2.12 Vegetation Management.....	36
5.2.13 Wildlife Management.....	36
5.2.14 Recreational Resource Management.....	36
5.2.15 Aesthetic Resource Management.....	37
5.2.17 Cultural Resource Management.....	37
5.2.18 East and Westside Decommissioning.....	38
5.2.19 Keno Development	38
PRELIMINARY DETERMINATION OF 10(j) CONSISTENCY.....	41
SPECIFIC COMMENTS.....	65
SUMMARY	65
1.0 PURPOSE OF ACTION AND NEED FOR POWER.....	66
2.0 PROPOSED ACTION AND ALTERNATIVES	66
2.1 NO-ACTION ALTERNATIVE.....	66
2.2 PACIFICORP’S PROPOSAL.....	66
2.3 MODIFICATIONS TO THE PROPOSED ACTION.....	67
3.0 ENVIRONMENTAL CONSEQUENCES.....	68
3.3.1 Klamath River Geomorphology	68
3.3.2 Water Resources.....	70
3.3.3 Aquatic Resources.....	71
3.3.4 Terrestrial Resources.....	77
3.3.5 Threatened and Engangered Species.....	79
3.3.6 Recreational Resources	79
3.3.7 Land Use and Aesthetic Resources	88
3.3.8 Socioeconomic Resources.....	88
3.3.9 Cultural Resources	89
4.0 DEVELOPMENTAL ANALYSIS	90
5.0 STAFF CONCLUSIONS	95
LITERATURE CITED	99

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GENERAL COMMENTS

The comments and recommendations herein are provided in accordance with the provisions of the Federal Power Act (FPA), (16 U.S.C. § 791 *et seq.*), the Fish and Wildlife Coordination Act (FWCA), (16 U.S.C. §661 *et seq.*), the Endangered Species Act (ESA), (16 U.S.C. §1531 *et seq.*), the Federal Land Management and Policy Act (FLPMA), (43 U.S.C. § 1701 *et seq.*), the Klamath River Basin Fishery Resources Restoration Act (Public Law 99-552), the Reclamation Act of 1902 as amended and supplemented (32 Stat. 388), the Outdoor Recreation Act of 1963 (16 U.S.C. 4601-1), the NPS Organic Act (39 Stat. 535), the Wild and Scenic Rivers (WSR) Act (Pub. Law 90-542), the National Trails System Act (16 U.S.C. 1246(a)), the National Environmental Policy Act (NEPA) (42 U.S.C. § 4321 *et seq.*), and federal trust responsibilities to Indian Tribes.

On September 27, 2006, in the Klamath Project Energy Policy Act hearing, the Administrative Law Judge (ALJ) was presented with a number of the same factual issues and representations upon which FERC relied in its DEIS. The ALJ's findings of fact and the science upon which the ALJ decisions were based is included in his decision (Administrative Law Judge 2006) and the hearing which includes testimony and scientific evidence. The hearing record has been filed with the Commission for inclusion in the licensing record. 50 CFR §221.60(c)(2). The Department's comments herein reference extensively to these findings of fact and supporting science. The ALJ's Findings of Fact have been filed with the Commission and his summary should prove helpful to the Commission. Throughout the Department's comments on the DEIS, the ALJ's decision is referenced as follows: ALJ Decision at [page number][Finding of Fact (FOF) number]; ALJ Decision at [page number][Ultimate Findings of Fact and Conclusions of Law (UFOF)]; and his ruling in Appendix D on Proposed Findings of Fact are referenced as ALJ Rulings at [D-page number][Ruling number]. Testimony and exhibits submitted in the hearing are cited [Agency] [Witness Name], [Exhibit Number], and [page number], where applicable.

DEIS Staff Conclusions

5.2.1 Flushing Flows and Gravel Management

The DEIS did not adequately analyze the impacts and mitigating effects of proposed seasonal high flows, instead focusing on only one (flushing of fine silt) of the many factors considered in the purpose and need for bed mobilizing flows in the bypassed reaches. The DEIS did not include adequate analysis of many of the important factors affected by the diversion of approximately 3,000 cfs from the J.C. Boyle bypassed reach nor the expected results of implementing the agency prescriptions for a flow triggered seasonal high flow event lasting one week in duration. Much of the information needed to conduct an adequate analysis can be found

in the rationale for the seasonal high flow preliminary 4(e) condition (U. S. Department of the Interior 2006) and the voluminous information associated with the Klamath Hearing regarding Issues 10, 11, 14, and 16. The effects of flushing flows on reed canary-grass, long term riparian maintenance flows, alluvial feature formation and channel complexity were all covered extensively in these documents. The DEIS needs to incorporate these factual findings in revising the staff alternative and fully consider the underlying data and analyses that led to these decisions.

The analysis and subsequent conclusions regarding adequacy of flows proposed by PacifiCorp relied extensively on PacifiCorp studies that are either flawed or have enough uncertainty that they are unreliable for forming reasonable conclusions. Without further consideration of additional information provided by the resource agencies and others during this proceeding, the DEIS does not provide adequate analysis from which reasonable conclusions can be made.

Flushing of fine sediment: “Provision of annual flushing flows [in the JC Boyle bypassed reach] as recommended by the agencies could help to ensure that spawning areas used by trout remain sufficiently free of silt to support egg incubation and trout recruitment.” Page 5-19, lines 18-20.

Facts and Adequacy of Analysis

The statement that the seasonal high flow will help maintain spawning areas is reasonable. This conclusion was affirmed by the ALJ’s finding that “*An annual flushing flow can clean and redeposit gravel to provide quality spawning habitat. To be effective, flushing flows need adequate duration and frequency to mobilize and redistribute fine sediments in the spawning beds*” (ALJ Decision at 43, FOF 14-8). However, BLM’s preliminary prescription for a seasonal high flow is misrepresented by the FERC staff conclusion on two important points. First, it is not prescribed annually but rather, it is triggered by an inflow to the J.C. Boyle Reservoir of more than 3,300 cfs. 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, 51 percent of the years between 1960 and 2004 (BLM Gard Ex 0, 2:7-9). Secondly, the flushing of fine sediments in spawning beds was only one of several reasons that the BLM Condition requires a periodic release of more than 3,300 cfs. Two other reasons supporting the need for seasonal high-flows are to increase stream channel complexity and to provide riparian maintenance flows. The rationale and benefits for these flows are clearly stated in the BLM rationale for the River Corridor Management Condition (US Department of the Interior 2006, pp. A-28-29).

Project diversions remove approximately 3,000 cfs from peak flow events. This results in significantly fewer events capable of performing ecologically important channel maintenance functions. In the bypass reach, PacifiCorp provides flows limited to 100 cfs 89 percent of the time. When flows greater than 100 cfs do occur in the bypass reach, they are abrupt, are short in duration, and do not reflect a flow regime with seasonal variability.

Statistics showing the magnitude of hydrologic change due to Project operations were provided to FERC in the March 27, 2006 response to the Final License Application citing Huntington (2006), which demonstrates that the Project reduces the magnitude and variability of monthly flows by 75 percent. Clearly, changes in flood flow regimes of this magnitude will have

ecological consequences beyond merely an increased ability to flush out fine sediments from spawning areas.

The hearing resulted in several critical findings regarding effects of the existing flow regime and the benefits of seasonal high flows in mitigating for multiple resource impacts. Effects of the current flow regime included encroachment of reed canary-grass, smaller alluvial features, reduced capacity to mobilize river bedload by 83 percent to 96 percent, and a reduction of mean annual flow from approximately 1,560 cfs to 296 cfs. Benefits of the seasonal high flow prescription include a more dynamic channel with a wider range of sediment deposition, an increase in the frequency and magnitude of flow events capable of scouring reed canary-grass from alluvial features, and a significant increase in flows capable of mobilizing the channel bed.

The importance of the seasonal high flow when viewed as part of the overall River Corridor Management Condition prescribed by BLM was highlighted in the ALJ's final decision regarding importance of these flows to fish habitat: "*Implementation of coordinated sediment delivery with seasonal high flows can result in deposition of gravel in velocity pockets on the bed and fine sands on the banks. These deposits have ecological benefits including creating spawning pockets around boulders and in pools*" (ALJ Decision at 42, FOF 14-4).

In addition to effects on riparian and fish habitat, the seasonal high flow was also determined to have important ecological benefits on trout rearing and migration. Based on radio telemetry and tagging studies provided by PacifiCorp and ODFW, it was determined that both downstream and upstream migration events were associated with increased flow (ALJ Decision at 43, FOF 14-17 through 14-19).

What is Needed to Complete the SDEIS

The DEIS failed 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. The SDEIS should be revised to include all relevant information provided by the Department and other resource agencies in their preliminary prescriptions and recommendations for the seasonal high flow. Additionally, important new information was put forward during the hearing. All relevant findings should be included in the SDEIS analysis and staff conclusions.

The SDEIS should be revised to adopt the rationale, as provided in the BLM River Corridor Management Condition (US Department of the Interior 2006 pages A-41 to A-42).

Adequacy of existing spill duration and quantity: "The average spill duration and quantity under existing conditions indicates that spillage to the J.C. Boyle bypassed reach is sufficient to flush fine-grained sediment during many years." Page 5-19, lines 22-23.

Facts and Adequacy of Analysis

Although it is unclear from these conclusions, it is assumed that FERC has interpreted "sufficient spill duration and quantity" based on PacifiCorp's mobilization threshold estimates and the fact that spill equal to or above the proposed threshold flow occur relatively frequently. The numbers generated for the threshold of mobility relied heavily on PacifiCorp's gravel tracer study. . Numerous biases built into their studies caused bed mobilization thresholds to be inconclusive.

Among the problems noted, the sites selected for the gravel tracer study were not representative of the channel. The tracer particles used in the study in the bypass reach were placed in the steepest section of the river and were limited to the center of the channel. The flow numbers generated to describe the threshold of mobility relied on biased pebble count data to characterize the grain size distribution of the existing bed and bars. Again, the pebble count sites selected were those with smaller sized material, and were not representative of the entire cross section. These factors would all tend to result in a significant underestimation of bed mobility threshold flows. These findings are in addition to precautions from the study authors who noted that because a significant fraction of the total shear stress is not actually available to mobilize the bed, the estimates of flow at incipient motion likely underestimates the flow required to mobilize the bed for both with-Project and without-Project conditions (PacifiCorp 2004, Water Resources Final Technical Report, page 6-19).

The conclusion relies on two assumptions: a) that 1,700 cfs actually adequately mobilizes the armoring layer, allowing subsurface fines below to move also; and b) that the frequency and duration of this flow is adequate to flush spawning gravels.

There are several reasons why the threshold of mobility modeling results should be considered as having a wide range of error around them. The analysis should reflect the uncertainty associated with the 1,700 cfs flow at which the bed is mobilized. In fact, the evidence suggests that 1,700 cfs underestimates the threshold of mobility in this system.

Table 3-6 (DEIS page 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. The duration of flows above 1,700 cfs occurs between 28 and 100 percent of the time without-Project and between just 2 and 16 percent of the time with the Project. Thus, 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.

FERC relies on Table 3-18, DEIS page 3-73 for its analysis of adequacy of spill magnitude. This analysis, which provides average spill rates summarized by month, provides little insight to the actual frequency and magnitude of high flow events. There is no peak flow analysis and the return interval for which bed mobilizing flows are provided is not apparent in the DEIS.

What is Needed to Complete the SDEIS

The conclusion that the existing average spill duration and quantity is sufficient to flush fine-grained sediment during many years 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.) The SDEIS should resolve this apparent contradiction.

The SDEIS should complete its impact analysis by including all of the relevant material provided in the Department's filing of preliminary conditions as well as the findings and information resulting from the hearing. By not fully analyzing the flow and gravel alternatives provided by BLM and the other agencies, FERC staff conclusions have defaulted to the position that spawning gravels will be adequately flushed by maintaining the current operational regime. The SDEIS should be revised to recognize the biases, errors, and inherent underestimates of bed mobilizing flows proposed by the PacifiCorp study. Then, using industry standard approaches,

the various flow alternatives should be evaluated against the revised bedload mobility estimates (including appropriate error bracketing.)

The issue of whether existing Project flows are sufficient to flush fine grained sediments from the bypass reach was put forward during the hearing. PacifiCorp's position, that existing spill flows are sufficient for this purpose, was rejected by the ALJ in his final ruling (Administrative Law Judge 2006). Based on observations and data provided by Department witnesses, the ALJ ruled that the seasonal high flow would mobilize and transport sediment more frequently than current operations (ALJ Decision at 38, FOF 10-4), and the seasonal high flow would flush observed fine sediment build up and thus improve the quality of spawning habitat (ALJ Decision at 42, FOF 14-8). The DEIS needs to incorporate these findings in revising the staff alternative and fully consider the underlying data and analyses that led to these decisions.

Comparison of trout density to other rivers: "J.C. Boyle bypassed and peaking reaches currently support high densities of trout comparable to those in the lower Deschutes River which is one of the most productive rivers in Oregon." Page 5-19, lines 22-23.

Facts and Adequacy of Analysis

FERC improperly uses catch rates and fish densities as the only rationale for adequacy of existing and proposed flow regimes for the bypassed reaches. FERC overlooks other relevant information about the population which demonstrates impacts due to Project operations, including low Project flows and low food availability. For example, as discussed in the justification for the BLM River Corridor Management Condition (page A-31 to A 32), numerous studies dating back to the early 1980's demonstrate that trout are significantly larger and have higher growth rates in the Keno Reach than in the J.C. Boyle Peaking or Bypassed River Reaches (FERC 1990, citing City of Klamath Falls, 1986; Buchanan et al. 1991; Buchanan et al. 1994; Hemmingsen et al. 1992; Addley 2005). In a recent report ODFW (2006) validated previous studies which show that there are few older and larger fish in the peaking reach and these fish have a low growth and condition factor relative to trout in the Keno Reach. See DEIS comments on 5.2.5 Instream Flows, J.C. Boyle Bypassed Reach regarding the fishery in the J.C. Boyle Bypassed and Peaking reaches.

FERC staff concludes that redband trout in the J.C. Boyle peaking reach are sufficiently abundant based on a single population estimate conducted over 22 years ago. Redband trout population estimates were 890 fish per mile for fish over 7.8 inches in the upper six miles of the peaking reach and 1,911 fish per mile in the next five miles. The Klamath River redband trout abundance data for the J.C. Boyle peaking reach was collected once over 20 years ago and it was never repeated to verify for accuracy. FERC staff failed to note that redband trout is the only major salmonid species in the river and then used a comparison with the Deschutes and Metolius rivers to conclude that redband trout are abundant and therefore are not impacted by Project operations. This comparison is inappropriate because the Deschutes River has a fishery comprised of multiple and abundant anadromous and resident salmonid species in multiple year classes including fall Chinook, migratory Spring Chinook from tributaries, steelhead, bull trout, brown trout, and mountain whitefish.

What is Needed to Complete the SDEIS

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. 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. In the SDEIS, comparisons to other rivers should be restricted to river systems with comparable biological and hydrological attributes.

Flushing flow and Gravel Augmentation: “Augmentation of gravel in the bypassed reach and elimination of agricultural diversion...should improve the recruitment of trout fry from the primary locations where most of the spawning ...[is] thought to occur.” Page 5-19, lines 24-27.

Facts and Adequacy of Analysis

While we agree that spawning gravel augmentation and increased flows in Shovel Creek could increase spawning success, there is no indication that gravel augmentation and increased flows in Shovel Creek would mitigate for all other flow related impacts or would substitute for 4(e) flows.

The Seasonal High Flow component of the River Corridor Management Condition is designed with the intent of increasing good quality spawning habitat for resident and anadromous fish species throughout the bypassed reaches. Importantly, the flushing flow prescriptions put forward by the agencies are also intended to increase channel complexity, macroinvertebrate production, and riparian habitats by providing flows capable of producing well-sorted gravel deposits, fine sediment deposits in floodplains or margin areas, and dynamic point bars.

Despite PacifiCorp’s assertion during the hearing proceeding that there would be no net benefit to the redband trout population from the seasonal high flow, the ALJ concluded that the BLM seasonal high flow would assist in the creation of redband trout spawning habitat, decrease fine sediment embeddedness in spawning gravel, and improve redband trout migration. His final conclusion was that these benefits provide for a net positive effect to redband trout spawning (ALJ Decision at 42, FOF 14-4 through 14-9).

FERC staff makes the conclusions that if spawning habitat in the bypassed reach and in Shovel Creek are enhanced, that this would sufficiently mitigate for all other flow related impacts to the productivity of the redband trout population. This analysis is not sufficient in that it makes two broad assumptions that are not substantiated. First, it assumes that spawning habitat is the only significant limiting factor for the trout population. Second, it assumes that the Staff alternative of unspecified gravel augmentation in the bypass reach will fully mitigate for past and ongoing sediment deficits. The seasonal high flow was designed to address multiple long-term and ongoing habitat impacts related to flow diversions, effects on habitat quality, including food production, habitat complexity, and the distribution of fine and course sediments. The Staff alternative fails to recognize and adequately analyze the seasonal high flow with respect to the multiple resource issues it is intended to address.

What is Needed to Complete the SDEIS

The SDEIS should clarify the expected outcomes of gravel augmentation and clearly describe how this outcome is expected to mitigate effects of flow diversions in the bypassed reaches. The

SDEIS needs to include information provided in the March 2006, Department response to the FLA. The DEIS needs to incorporate the findings of fact resulting from the hearing as they relate to current Project impacts and the expected benefits of the seasonal high flow prescription.

Flushing flow in the Copco No. 2 bypassed reach: “For the Copco No. 2 bypassed reach, we conclude that this reach is unlikely to support a quality trout fishery given the seasonal poor water quality conditions of flows that are released into the bypassed reach from Copco reservoir and the lack of any tributaries that could provide suitable temperature refugia. Furthermore, our review of the average spill duration and quantity indicates that spillage to the Copco No. 2 bypassed reach is sufficient to flush fine-grained sediment in many years. Because of the limited capacity of the reach to support a trout fishery, we conclude that implementing flushing flows in the Copco No. 2 bypassed reach as recommended by FWS, Cal Fish & Game, and Oregon Fish & Wildlife would not be worth the estimated annualized cost...” Page 5-19, line 34-42.

Facts and Adequacy of Analysis

FERC’s conclusion that redband trout would not support a quality trout fishery is not substantiated by the facts in the record. The fast growing and relatively large fish of the Keno reach of Klamath River, where water temperatures are equal to or even higher than at Copco Dam releases (See water quality model outputs, PacifiCorp 2005), is clear evidence that trout can survive in warm water reaches of the Klamath River. Regardless, the flushing flow prescription recommended by the Service was intended to provide a variety of ecological benefits, only one of which was the restoration of spawning habitat for redband trout. Similar to the analysis for the J.C. Boyle Bypass reach, FERC appears to disregard the other purposes and benefits that would occur by restoring a flood flow regime capable of mobilizing the channel bed.

FERC refers to the same flawed bedload threshold flow analysis and relied on limited spill data provided by PacifiCorp to conclude that spill is adequate to provide bed mobilizing flows. This analysis is inadequate for the same reasons cited above for the J.C. Boyle bypassed reach.

The ALJ concluded that, “warm water temperatures in the summer and cold water temperatures in the winter will not preclude anadromous fish from successfully utilizing habitat above Iron Gate Dam” (ALJ Decision at 14, FOF 2A-14). Chinook salmon are less tolerant of warm water conditions than are resident trout (EPA 2003). The fact that the Copco 2 bypassed reach historically supported spawning Chinook salmon (DEIS, page 5-19, line 43) indicates that the reach would support resident trout, given adequate flow and habitat conditions.

What is Needed to Complete the SDEIS

The DEIS needs to include the new information that has come to light following the hearing in a revised analysis. Further, the impacts analysis and rationale for the seasonal high flow prescriptions provided in the March 2006 filing (U.S. Department of the Interior 2006) should be incorporated into the staff conclusion. Rather than compartmentalizing the effects of a single mitigating measure acting alone, the analysis needs to consider the cumulative benefits of the entire suite of proposed measures. These measures, including increased base flows, gravel augmentation, and seasonal high flows, act together to mitigate for Project water quality and habitat impacts. Additionally, the adaptive capacity of resident trout was not adequately considered in the FERC staff dismissal of Copco 2 reach suitability as redband trout habitat.

Consideration of the ability of redband trout to adjust spawning time to diverse temperature regimes, and their relatively high thermal tolerance should be recognized in the Staff alternative analysis [See Gard (2006) regarding the effects of temperature regimes on growth and thermal stress of redband trout in the Klamath River].

Gravel Augmentation Measures: “Several parties put forward gravel augmentation measures intended to increase spawning habitat for resident trout or anadromous salmonids downstream of PacifiCorp’s dams, which trap sediment and cause a deficit of gravel and finer sediments in downstream reaches.” Page 5-20, lines 7-9.

Facts and Adequacy of Analysis

The statement that several parties proposed gravel augmentation to increase spawning habitat for resident trout and anadromous salmonids downstream of PacifiCorp’s dams is an appropriate Staff conclusion. However, the importance of the additional purposes of the BLM River Gravel Management Plan is not addressed. The Plan is intended to augment sediment by providing quantities and sizes that would: increase availability of spawning habitat; increase channel complexity; and improve the quality of riparian habitat. The FERC staff fails to analyze the full scope of intended benefits of the BLM River Gravel Management Plan.

The purpose and benefits of the BLM River Gravel Management Plan were supported by the findings of fact from the ALJ in the hearing. The ALJ determined that the BLM proposed gravel augmentation program, combined with the seasonal high flow, will likely create a more dynamic channel with a wider range of sediment deposits. This sediment will be deposited higher on the channel margin, providing an ecological benefit (ALJ Decision at 38, FOF 10-5). In addition, the ALJ stated that implementation of coordinated sediment delivery with seasonal high flows can result in deposition of gravel in velocity pockets on the bed and fine sands on the banks. These deposits have ecological benefits including creating spawning pockets around boulders and in pools (ALJ Decision at 42, FOF 14-4).

The Staff did not adequately analyze the effects on riparian and fish habitat from the trapping of sediment due to Project dams. Further, analysis of the expected results of implementing the BLM prescription of sediment augmentation was lacking. The Staff focused on only one (increasing of spawning habitat) of the many factors considered in the purpose for sediment augmentation. Since the BLM River Gravel Management Plan was also intended to improve the quality of riparian habitat and increase stream channel complexity, these aspects need to be evaluated as well. Much of the information needed to conduct an adequate analysis can be found in Cluer’s written testimony for the hearing (Cluer, Ex. 0) and the BLM River Corridor Management Condition (U. S. Department of the Interior 2006). The effects from the lack of sediment due to the Project dams on stream channel complexity and rearing habitat and riparian habitat were all covered extensively in these documents.

Development of gravel augmentation plan. “Mapping of gravel before and after gravel placement would be useful to help quantify the measure’s benefits and to guide future gravel augmentation efforts.” Page 5-20, lines 42-43.

Facts and Adequacy of Analysis

The statement that mapping of gravel before and after placement would be useful to help quantify the benefits and guide future augmentation efforts is an appropriate Staff conclusion. This type of mapping exercise for pre-gravel placement was completed by Cluer for the hearing (Cluer, Ex. 0, 10:20 to 13:4). Based on an assessment of the bed material in the J.C. Boyle bypass reach, an estimate of the percentage of the bed that could trap coarse sediment was determined (Cluer, Ex. 0, 12:25,13:1-2). This coarse sediment would include a range of sizes to benefit spawning, rearing, and riparian habitat. Consistent with the Staff Conclusion, subsequent augmentation volumes would be determined following results of monitoring.

For the River Gravel Management Plan, the BLM used the quantities of gravel offered by PacifiCorp to provide maximum and minimum estimates for the amount of gravel augmentation. However since this preliminary condition was developed, new analysis has been conducted (Cluer, Ex. 0, 11:3 to 13:2) that was based on current channel bed conditions. Therefore a new and justified estimate of initial sediment augmentation has been provided (See previous paragraph.)

The BLM River Gravel Management Plan included extensive monitoring and adaptation. This type of monitoring and adaptation are necessary processes in supplying sediment effectively to a changing river system.

Although this Staff Conclusion is appropriate, the BLM River Gravel Management Plan would supply a range of sediment sizes, not just gravel. The range of sediment sizes would be provided to increase spawning habitat, increase channel complexity (rearing habitat), and improve quality of riparian habitat. The analysis of the importance of supplying various sizes of sediment is in Cluer's written testimony for the hearing (Cluer, Ex. 0) and the BLM River Corridor Management Condition (U. S. Department of the Interior 2006). The findings of fact from the ALJ support these analyses.

Neither the DEIS or the FLA clearly describe why 100 to 200 cubic yards of gravel is proposed by the Staff or PacifiCorp, how these quantities were determined, or the relevance to physical setting and processes. The Staff used the quantity of gravel PacifiCorp proposed to approximate the cost of gravel augmentation, but did not explain why these numbers were used for the estimate. Since the Staff Alternative is to develop a gravel augmentation plan based on mapping and monitoring, the analysis of costs based on a quantity of gravel that is not justified is inadequate. The FLA also contains contradictory information: 100 to 200 cubic yards in the J.C.Boyle bypassed reach is proposed (FLA Exhibit E page 4-170), yet 10 to 20 percent of the total sediment yield is also proposed. The FLA states,

“The volume of the initial augmentation in selected reaches is calculated as 10 to 20 percent of the average annual volume of tributary and hillslope inputs trapped in the upstream Project reservoir(s). The range of 10 to 20 percent adjusts the results of the sediment budget to reflect the fact that only a fraction (probably less than 10 percent) of the total tributary sediment yield in each reach is composed of spawnable material” (FLA p.4-169.0).

In the FLA PacifiCorp proposed gravel augmentation of 10 to 20 percent of the average annual volume of sediment input trapped in upstream Project reservoir(s) to adjust for the amount that would comprise spawnable material. However, the BLM River Gravel Management Plan is

proposed for reasons other than to increase availability of spawning habitat. Thus, similar to what the Staff Conclusion states, mapping of *sediment* before and after placement would be useful to determine quantities and benefits.

Adaptive management: “The reporting aspects specified by the resource and land management agencies and the Hoopa Valley Tribe for gravel augmentation would provide for coordination and review of the program by the Commission and stakeholders, and allow for consultation regarding any proposed changes to implementation and monitoring.” Page 5-21, line 3-7.

Facts and Adequacy of Analysis

The Staff Conclusion that reporting monitoring information from gravel augmentation would provide for coordination and review and allow for consultation of proposed changes to implementation and monitoring is appropriate. However, the BLM River Gravel Management Plan included extensive monitoring and adaptation in the Plan. This type of monitoring and adaptation are necessary processes in supplying sediment effectively to a changing river system.

Gravel Placement Estimate: “To estimate the cost of implementing the approach recommended by Oregon Fish & Wildlife, Cal, Fish & Game, and the Hoopa Valley Tribe, we have assumed 10 annual placements of the quantity of gravel proposed by PacifiCorp in the J.C. Boyle bypassed and Iron Gate to Shasta reaches.” Page 5-21, lines 9-11.

Facts and Adequacy of Analysis

The measures proposed specify no minimum or maximum amounts of sediment associated with their implementation, thus the assumption that 10 annual placements would be sufficient is arbitrary. Staff states that these measures include “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.” Since it is uncertain what “plan” is being referenced, it is unclear as to whether the intent is to provide sediment for a specific number of redds or for an area of the stream channel. A more realistic approach would be to calculate the amount of channel capable of retaining sediment, and as stated by staff “surfaces suitable for riparian recruitment,” and to base cost estimates on these quantities. An estimate of the area of the bypass reach capable of retaining sediment was made by Cluer in his testimony (Cluer, Ex. 0). He calculated that 36 percent of the reach would retain sediment, and that the quantity needed to “fill” those areas would be approximately 26,600 cubic yards (Cluer, Ex. 0, pp. 11:3 to 13:2). This type of estimate would provide a more realistic range of costs associated with implementing augmentation to meet as-yet unspecified goals.

What is Needed to Complete the SDEIS for gravel management conclusions.

The SDEIS should clarify the errors, assumptions, and recognized biases identified the PacifiCorp sediment budget data upon which the Staff recommendations were based.

The SDEIS should conduct its impact analysis in consideration of the mutually beneficial links between the sediment augmentation and the use of the prescribed seasonal high flows for: 1) channel maintenance and complexity, 2) riparian restoration and function for native species, and 3) redband trout spawning and rearing habitat. In addition, an adequate effects analysis would

include the impacts to the river system from the lack of sediment due to Project dams and reservoirs as well as an assessment of the effects that would likely result from augmentation.

While we recognize that FERC has adopted many of the elements of our proposal for a gravel management plan, including gravel mapping, gravel augmentation, and monitoring, the SDEIS needs to give full and equal consideration for agency recommendations that provide sufficient sediment for purposes other than spawning habitat, such as rearing habitat provided by channel complexity and riparian habitat. A range of sediment sizes to satisfy these needs should be included in the SDEIS.

5.2.2 Restoration of Slopes and the Channel at the J.C. Boyle Bypassed reach

Emergency Spillway Restoration: “Agency documentation and our observations of the severe erosion downslope of the emergency spillway and resultant degradation of the bypassed reach channel are strong reasons to minimize the future use of the emergency spillway (DEIS 5-22, lines 31-33). The existing substantial erosion downslope of the emergency spillway cannot be left in its current unstable state without resulting in further damage to the bypassed reach channel, and adjacent access road. We consider restoration of this slope to be imperative.” Page 5-22, lines 39-41.

Facts and Adequacy of Analysis

We concur with the DEIS analysis and the conclusion that restoration of the spillway erosional area is imperative. However, additional analysis and details regarding the actions proposed for restoration of the hillslope should be provided to clarify the impacts of the proposed staff alternative. For example, will the restored hillslope be designed to accommodate less frequent spill events or none at all? If the restored spillway slope will accommodate some, albeit rare spill events as suggested, what will be the ongoing impacts to aquatic habitat from these events?

Important new information has surfaced regarding the existing spawning areas in the JC Boyle Bypassed reach. The only observed trout spawning activities, including the presence of redds, currently occur in the main stem bypass reach just downstream of the existing J.C. Boyle emergency canal spillway (ALJ Decision at 44, FOF 14-21). The location of the redds near the erosional feature, is relatively unstable for two reasons. First the spillway can be used at any time and its use probably destroys or buries redds and spawning gravel patches. Second, the slope of the channel in this location is very steep, making this location inherently unstable during flood flows in the bypass channel (ALJ Decision at 44, FOF 14-23). Recent observations of the very small and unstable spawning area in the JC Boyle bypass reach documented 50 percent embeddedness in two sites, and the loss most of the previously surveyed spawning habitat that was present in a 2003 survey (see testimony of Mark Gard, Ex. 0)

What is Needed to Complete the SDEIS

The DEIS needs to clarify whether the synchronized bypass valve proposed by PacifiCorp will entirely eliminate or simply minimize spill events when a unit trips offline (DEIS p. 3-29 lines 34-35). Whether or not spill is actually eliminated or not will have a significant bearing on the cost, design, and resource impacts of slope rehabilitation. If the rehabilitated site does not need to accommodate any spills, it will likely cost considerably less to restore and stabilize the site.

Alternatively, if there is even a remote chance that a spill would occur, a restored spillway would need to be designed to accommodate a large volume of water without initiating catastrophic erosion.

The analysis should include the anticipated long-term impacts of the proposed hillslope restoration on the known spawning areas directly below the spillway. Although the negative impacts of sedimentation and unscheduled spills were adequately addressed, the eventual loss of this source of fine and coarse sediment to the bypass reach was not addressed. The final EIS should address the impacts to existing spawning habitat and any mitigation proposed for its eventual decline or loss.

The final EIS should include the relevant ALJ findings regarding the impacts of eliminating spill events and the relative instability and limited extent of the existing spawning areas. Additionally, the relationship of the hillslope erosion and spillway operation should be considered with respect to various gravel augmentation and sediment management plans.

5.2.3 Project Operations

Existing gage installations. “PacifiCorp already monitors, or in some case provides assistance to USGS for monitoring and recording, many hydrologic indicators, such as reservoir water levels and stream gage sites in the Project area (see table 3-35). Daily and, in many cases, hourly or shorter interval data recording allows PacifiCorp to manage its facilities for hydroelectric generation and document environmental compliance with the terms of its existing license.” Page 130, lines 22-26

Facts and Adequacy of Analysis

No gage currently exists in the JC Boyle Bypass reach so that it is not currently possible for PacifiCorp to monitor compliance with the 9 inch ramp rate in this reach.

What is Needed to Complete the SDEIS

To ensure Project compliance with mandatory flow conditions as well as to provide flexibility for adapting future Project operations, the SDEIS should include a requirement for installation of gages where needed to appropriately monitor inflow and outflow from each facility.

5.2.4 Water Quality Management

We agree with much of your analysis of Project effects on water quality as discussed on pages 3-132 through 3-134, and 3-146 through 3-149 concluding that Copco and Iron Gate reservoirs act as sources of nutrients during the summer, and that “because the water quality at Keno reservoir influences water quality at all downstream Project developments, development of a water quality management plan that encompasses all Project waters, not just Keno reservoir, should be considered when specific remedial measures are developed”. However, your analysis did not assess the impacts of your water quality concerns 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 DEIS 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 (DEIS, page 3-294, line 23). However, the water quality comprehensive management plan required in measure 4P should be viewed as an expenditure with real benefits to water quality in the Project reaches. As described in the DEIS, 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. But these conditions will be at least partially reversed by the water quality management plan implementation. In addition, the timing of anadromous fish migration precludes impact during the dry summers, thus, the ALJ decided that “warm water temperatures in the summer and cold water temperatures in the winter will not preclude anadromous fish from successfully utilizing habitat above Iron Gate Dam” (ALJ Decision at 14, FOF 2A-14).

5.2.5 Instream Flows

This section will focus on the adequacy of the impact analysis with regard to instream flow issues discussed in the DEIS section 5.2.5. Please see our more detailed comments on the instream flow issues in the Preliminary Determination of 10(j) Consistency section of this letter, below.

J.C. Boyle Bypassed Reach

Instream Flows For J.C. Boyle Bypassed Reach

The DEIS does not adequately describe or analyze the impacts of low flows in the J.C Boyle bypassed reach to resident fish resources and does not adequately analyze alternative flows which address the need of resident fish for improved flows below J.C. Boyle Dam. It does not address discharge impacts in the 0.5-0.8 miles upstream of the springs. The proposed flows perpetuate the existing dewatered condition in the J.C. Boyle bypassed reach with a slightly larger but still inadequate flow of 200 cfs below the dam. It also perpetuates cooler water temperatures than what redband trout are adapted to and will continue to limit growth and productivity of the population below the springs.

The SDEIS needs to adequately describe and analyze impacts to resident fish resources, in particular rainbow redband trout, due to the Project and its operations. The SDEIS needs to give full and equal consideration to an alternative that proposes a streamflow regime that is adequate to improve rainbow redband trout habitat to levels more closely resembling what occurred pre-Project. It needs to include analysis of stream temperature effects on rainbow redband trout and include more caveats regarding the habitat vs. flow values found using 1D PHABSIM modeling. It should include analysis of 2D PHABSIM modeling, Tennant/Tessman approach, side channel analysis, and any other methods of flow analysis proposed by resource agencies.

Ramp Rates For J.C. Boyle Bypassed Reach

PacifiCorp did not conduct ramping effects studies in the J.C. Boyle bypassed reach where trout fry and spawning are known to occur. There are known spawning areas in the bypassed reach where spawning habitat and incubating fish embryos could be dewatered due to ramping effects. Stranding and trout mortality likely occur when there is a sudden drop in flows after a sustained period of high flows (Dunsmoor 2006).

Because BLM 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 SDEIS analysis, the FERC staff should incorporate that Judge's findings of fact with respect to the risks and impacts of ramping in the bypass reach. The staff alternative needs to include analysis of impacts to salmonids other than trout (i.e. coho, Chinook salmon) since the staff alternative includes the possibility of anadromous fish reintroduction.

J.C. Boyle Peaking Reach

In addition to the direct impacts of stranding resulting from downramping, the impacts of upramping were also at issue in the EPAct trial type hearing. At issue, were the effects of up and down ramping on food availability, trout growth at age, macroinvertebrate drift rates, and the energetic costs due to rapid fluctuations in river stage. FERC in their conclusions, recognize these impacts with respect to size and growth of redband trout in the peaking reach but discounts their importance with respect to overall health and productivity of the population, again making inappropriate comparisons to catch rates and populations size of other river systems. For a complete list of the ALJ's findings of fact regarding peaking and ramping impacts, see ALJ Decision at 42-47, FOF 16-1 - 16-22.

It is precisely because the redband trout population reveals deficiencies in age, growth, and survival due to Project operations that BLM has determined that the existing and proposed ramp rates do not provide for adequate protection of the fishery resource.

It is illogical that the DEIS 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. The SDEIS should explain this logic or adopt an equally protective ramp rate restriction for the peaking reach.

FERC 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 SDEIS should include all data relevant and analysis provided to the record under this proceeding. In the SDEIS, FERC should 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.

Copco No. 2 Bypassed Reach

Our 10(j) recommendation for flows in the Copco No. 2 bypassed reach should be included, without modification or limitation in the Proposed Action in the SDEIS.

Fall Creek

The DEIS analysis did not include the information or analysis provided by the resource agencies and other stakeholders including the Department. FERC staff also needs to consider the recent ALJ Findings of Fact for Fall Creek.

Fall Creek is a small creek, especially in comparison to the Klamath River. Fall Creek resources will not receive the level of scrutiny and attention given to the mainstem river reaches of the Project. However, Fall Creek is a perennial stream with exceptional water quality and, except for the Project, is relatively unimpaired. This makes it a unique stream resource within the upper Klamath River watershed.

The SDEIS should analyze the higher flow alternatives recommended by the resource agencies, such as providing 40 percent of the instantaneous flow to the bypassed reach. This would mimic an acceptable level of intra-annual variability and provide good aquatic habitat. The weighted usable area curves indicate this range of flows will provide roughly 50 percent of the simulated adult rainbow trout habitat and 95 percent of the simulated juvenile rainbow trout habitat. This is a reasonable balancing of Project costs and resource benefits and should be incorporated into the SDEIS Staff Alternative.

Spring Creek

Beyond impacting water temperature in Jenny Creek, PacifiCorp's Spring Creek diversion also reduces aquatic habitat in Spring Creek. These impacts should be identified in the SDEIS. The SDEIS should also analyze the impacts of implementing flow recommendations of the resource agencies for Spring Creek such as providing 50 percent of inflow, and our alternative recommended below, 4 cfs September 16 through May 31.

Iron Gate

The SDEIS should recognize that 12,244 acre-feet is an estimate of the current storage capacity of the Project reservoirs assuming normal operations (DEIS, page 5-34, lines 12-17). As we stated in U.S. Department of the Interior (2006), page D-40, "Our estimate of active storage for these reservoirs is different from the amount reported in the Applicant's documents, which report only the active storage that is available during normal operations. The USGS has estimated actual active storage in Copco and Iron Gate Reservoirs at approximately 52,000 ac/ft. (Campbell and Heasley, pers. comm.). They used a procedure outlined in the September 27, 2005, memo attachment to the U.S. Fish and Wildlife Service November 17, 2005, letter commenting on PacifiCorp's response to information request AR-1a, dated September 2005. A volume of 52,000 AF would provide approximately 875.4 cfs per day for a 30 day month (Campbell, pers. comm.)."

Impacts of documented strandings of anadromous salmonids and other fish as a result of Iron Gate Dam operations (USDI Fish and Wildlife Service 1998 and Shaw pers. comm.) should be described in the SDEIS. Appropriate operational requirements that are within the ability of the permittee to implement should be identified in the SDEIS.

5.2.6 Anadromous Fish Restoration

The view of anadromous fish restoration in the DEIS does not consider that significant habitat exists throughout the Project reach and the fact that the Applicant's dams have absolutely and completely blocked access to this habitat and to hundreds of miles of anadromous fish habitat above the Project. At the same time, the DEIS does not account for the benefits of access to this

habitat. The DEIS fails to acknowledge that, despite other obstacles and the responsibilities of other parties (the DEIS makes reference specifically to the Department's Bureau of Reclamation), without adequate fishways at the Applicant's dams, restoration of these runs cannot be achieved and agencies cannot begin to meet their goals and objectives. The DEIS fails to specify actions to avoid or mitigate these impacts and instead relies on an incomplete and undeveloped plan to resolve these issues, without any certainty that such plan would achieve mitigation for the blockage of anadromous runs or achieve restoration goals of the Agencies.

Reservoir Predation and Water Quality Risks: "PacifiCorp's alternative trap and haul prescription would avoid mortality due to predation or poor water quality conditions in Project reservoirs." (page 5-36, line 32)

Facts and Adequacy of Analysis

The DEIS does not adequately analyze the potential for predation and water quality risks associated with Project reservoirs in light of substantial, relevant information in the ALJ's Decision and the record.

Predation - The ALJ found and the record demonstrates that predation of outmigrating salmonids above Iron Gate Dam is likely to be low (ALJ Decision at 15, FOF 2A-19), and that whatever predation may occur can be minimized through use of remedial measures (ALJ Decision at 36, FOF 7-13). The ALJ also found that likely mortality rates of juvenile anadromous salmonids migrating through reservoirs will vary widely among species, and will depend largely on size (larger migrants will do better) of the migrating fish. Thus, small sub-yearling fall Chinook are likely to experience lower passage success than larger coho, yearling Chinook, or steelhead out-migrants (ALJ Decision at 15, FOF 2A-18).

Water Quality in Project Reservoirs – Based on the record evidence, the ALJ found that adult coho salmon enter the river to spawn in late September and reach peak migration strength between late October and mid-November when the water temperatures above Iron Gate Dam are low (ALJ Decision at 35, FOF 7-10). Further, juvenile coho salmon begin outmigrating to the ocean in late February and continue migration through early July. For a significant amount of the outmigration period, water temperatures are low (ALJ Decision at 36, FOF 7-11). While juvenile coho salmon rear in streams for one year and have a preference for cold water (ranging between 12 and 14° C), they can tolerate higher water temperatures (exceeding 20° C) where food is abundant, there are areas of thermal refugia, and other conditions are not stressful (ALJ Decision at 36, FOF 7-11). Therefore, water temperature will not preclude coho salmon from utilizing the habitat within the Project area (ALJ Decision at 36, FOF 7-12). The ALJ made similar findings for other species of anadromous fish (ALJ Decision at 17, FOF 2A-27 through 2A-29 (fall-run Chinook); ALJ Decision at 18, FOF 2A-35 and 2A-36 (spring-run Chinook); and ALJ Decision at 19, FOF 2A-43 and 2A-44 (steelhead). With respect to anadromous species and habitat in the Project reach, the ALJ found that warm water temperatures in the summer and cold water temperatures in the winter will not preclude anadromous fish from successfully utilizing habitat above Iron Gate Dam (ALJ Decision at 14, FOF 2A-14). The ALJ found strong evidence that anadromous salmonids could migrate through Project reservoirs and facilities in the fact that anadromous fish currently complete life cycles through eight dams and reservoirs on the Columbia and Snake rivers, and historically completed life cycles through Upper Klamath Lake (ALJ Decision at 15, FOF 2A-20).

What is Needed to Complete the SDEIS Regarding Reservoir Predation and Water Quality Risks

The SDEIS needs to adequately analyze the potential for predation and water quality risks associated with Project reservoirs in light of the substantial, relevant information in the ALJ's Decision and record on these issues. The SDEIS needs to adequately analyze mortality associated with the proposed Staff Alternative, trap and haul.

Trap and Haul: “[PacifiCorp’s alternative trap and haul prescription] would also limit mortality from cumulative stress and injuries that may be sustained during passage through multiple screening facilities. Mortality from these sources may be substantial, especially late in the migration season when water quality conditions become stressful. During truck transport, water quality conditions can be controlled and maintained, typically with minimal mortality.” (page 5-36, lines 34 to 38).

Facts and Adequacy of Analysis

The DEIS did not consider that the ALJ found strong evidence that anadromous salmonids could migrate through Project facilities in the fact that anadromous fish currently complete life cycles through eight dams and reservoirs on the Columbia and Snake rivers, and historically completed life cycles through Upper Klamath Lake (ALJ Decision at 15, FOF 2A-20).

In addition, there are numerous disadvantages for trap and haul on a permanent basis, including bypass of habitat, physiological stress, stress during periods of poor water quality, delayed adult mortality, delayed migration, straying of returning adults, and inability to distinguish resident fish from outmigrants in collection facilities that need to be analyzed in the SDEIS.

Trap and haul may be advisable on a species by species basis for an interim period. The advantage of reducing in-river migration time to spawning grounds may outweigh the disadvantages of trap and haul for restoring ocean type Chinook salmon to tributaries above Upper Klamath Lake, which is why the Services included in the Preliminary Prescriptions trap and haul methods around Keno Reservoir and Lake Ewauna on an interim, seasonal basis for Chinook salmon under certain circumstances (USDI Fish and Wildlife Service 2005b).

What is Needed to Complete the SDEIS Regarding Advantages of Trap and Haul

The SDEIS 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 (Fish Passage Center and Comparative Survival Study Oversight Committee 2006), as well as handling stress, mortality, and straying. Any trap and haul alternative needs to identify how predation and stress on small presmolt salmon would be managed in the presence of larger outmigrant steelhead. The SDEIS 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. Any trap and haul alternative needs to identify how anadromous steelhead and lamprey would be distinguished from resident stocks. Any trap and haul alternative needs to identify impacts to the full suite of migrating fish species.

Model Projections: - “Adult returns predicted based on PacifiCorp fish passage models were lower for volitional passage than they were for the trap and haul scenario, despite the fact that trap and haul would not provide access to habitat between Iron Gate and J.C. Boyle dams” (page 5-36, line 38). The DEIS also states that “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.” (page 3-294, line 24)

Facts and Adequacy of Analysis

First, the Applicant’s argument that ‘anticipated mortality levels that anadromous fish produced within the Project Area will likely experience over their entire life cycle establishes that habitat within the Project Area is not suitable for anadromous fish’ was rejected by the ALJ who recognized that the risk of mortality is not a determinative factor in habitat suitability (ALJ Decision at D-65, Ruling 249).

Further, the DEIS conclusions regarding adult returns for trap and haul overlook recent comparisons of trap and haul to in river migration on the Columbia River (Budy et al. (2002); Fish Passage Center and Comparative Survival Study Oversight Committee (2006)). Here, the fate of transported outmigrant Chinook once they have been hauled has been carefully studied. Transported Chinook have been shown to suffer greater delayed mortality than outmigrants that pass through the river and hydrosystem facilities. Indications are that these fish smolt as they migrate. Those that were given insufficient time to complete smoltification, such as transported outmigrants, experience high energetic costs in attempting to osmoregulate in salt water, resulting in decreased resistance to pathogens and increased susceptibility to predators (Marmorek et al. 2004). Fish transportation (trap and haul or barge) provided little or no benefit to wild spring and summer Chinook during most years and the delayed mortality of these fish was substantial most years relative to that of in-river migrants. Transported smolts died at twice the rate as in-river migrants once they passed the lower dam (Fish Passage Center and Comparative Survival Study Oversight Committee 2006). Overall, in an average year in the Columbia River system, Chinook that outmigrate in river have better survival to adulthood than fish that are transported (Budy et al. 2002); Howard Schaller, USFWS, pers. comm.).

Finally, the DEIS modeling conclusions are flawed because they are based on an inappropriate analysis (the EDT fish passage modeling), because 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) because the conclusions have not considered factors other than adult returns which are critically important for other species and runs.

The EDT fish passage modeling by PacifiCorp has no sensitivity analysis and the model results cannot be reliably evaluated. The U.S. Fish and Wildlife Service is on record (USDI Fish and Wildlife Service 2005a) that the KlamRas/EDT modeling effort (not the PacifiCorp fish passage EDT model) is the only process potentially reliable to use for modeling on this issue. The KlamRas/EDT modeling is valid for fall-run Chinook only. Subsequent modeling efforts using only EDT and applied to other species were not endorsed by the HMG or the Services.

Where the DEIS has relied on the appropriate KlamRas/EDT modeling results, its interpretation of those results is correct. The conclusion that returns of fall-run Chinook are similar for volitional passage versus trap and haul for fall-run Chinook around the lower four dams, is reasonable. However, given the precision of the KlamRas/EDT model, and the intent to use it for relative comparisons, these results should not be used to Project run sizes or the probability of establishing runs in the first place (USDI Fish and Wildlife Service 2005a).

The DEIS conclusions regarding the merits of trap and haul scenario have no basis when applied to other anadromous runs and species in the Klamath River. Again, the appropriate KlamRas/EDT modeling is valid for fall-run Chinook only and Projected numbers of returning adult fish to the basin is not the appropriate metric alone to make a decision regarding fish passage.

Factors in addition to adult returns are critically important for other species. For federal and state listed coho salmon these other factors include the fact 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 coho abundance (ALJ Decision at 87, UFOF 9).

For Pacific Lamprey these other factors include the fact that, while 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 (ALJ Decision at 37, FOF 8-3). Thus, trap and haul would deny lamprey the use of this habitat in the Project area.

For spring-run Chinook salmon, these other factors include the fact that coolwater refugial areas in the Project reach are potentially of great value to restoring these runs. Spring-run Chinook salmon in the Klamath Basin were very important historically, outnumbering fall Chinook stocks substantially (Gatschet 1890; Spier 1930), Hume in (Snyder 1931). While the majority of their spawning habitat is above the Project boundary, this run relies on coolwater refugial areas for oversummer holding. The largest coolwater habitat 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 this run habitat needed during a critical period of their life cycle.

What is Needed to Complete the SDEIS Regarding Model Projections

The SDEIS needs to consider recent comparisons of trap and haul to in river migration on the Columbia River, where Chinook that outmigrate in river have better survival to adulthood than fish that are transported. The SDEIS needs to consider the full suite of benefits to providing access to Project area habitats for all these species, taking into account their various life history strategies used to recolonize the area above Iron Gate Dam once passage is provided.

The SDEIS should consider factors other than adult returns. For federally and state listed coho salmon, this 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.

Volitional Passage Returns: “Because of the lower predicted returns and considerably higher costs, we do not include the provision of volitional fishways at PacifiCorp’s mainstem dams.”(page 5-36, line 44)

Facts and Adequacy of Analysis:

This conclusion focuses only on the cost of the mitigation and the *impact of the mitigation on Project profitability*. See our detailed comments in 4.0 Developmental Analysis, below. Staff acknowledges that "providing volitional passage at each dam is (*sic*) prescribed by NMFS and Interior would provide access to *more* habitat than PacifiCorp's alternative prescription..." [emphasis added] DEIS page 5-36, lines 30-31. Staff does not analyze the implications in terms of changes to the fishery resource for the full suite of fish species, and Staff even asserts that a trap and haul approach would result in *more* fish. The conclusion that volitional passage would result in lower returns is flawed. Information from the Columbia River system indicates that, in an average year, Chinook that outmigrate in river have better survival to adulthood than fish that are transported (Budy et al. 2002); Howard Schaller, USFWS, pers. comm.).

What is Needed to Complete the SDEIS Regarding Volitional Passage Returns

See the comments on ‘Model Projections’ above regarding the conclusion that volitional passage would result in lower returns. In regard to the analysis of costs, the SDEIS needs to provide information regarding the assumptions regarding all costs associated with an adequate trap and haul program. The SDEIS also needs to consider the benefits to all fish species, including the recovery of federally listed coho that would be associated with each alternative.

Anadromous Fish Restoration Assessment Plan: PacifiCorp should formulate an anadromous fish restoration assessment plan within 1 year; perform 3 years of radio telemetry studies; evaluate options where restoration looks promising; develop a plan to restore runs to a selected reach; and file the plan with FERC for approval within 5 years after license issuance (page 5-37, line 23).

Facts and Adequacy of Analysis: In some places (DEIS pages xxix, xxxv, 2-48, and 5-7) the DEIS Staff Alternative includes selecting “the most promising and cost effective reach for initial anadromous fish restoration efforts.” This description includes provisions for possibly reintroducing fall Chinook to more than one reach, based on study results. In other places (DEIS pages 3-299 and 5-37) no provision is made for reintroduction beyond the most promising and cost effective reach. The study and planning process discussed on pages 5-37 and 5-44 only includes 11S, the development and implementation of an anadromous fish restoration plan for the selected reach, not 12S, a fish passage resource management plan (see page 2-48 and page 5-7). While unclear on this point, the Staff Alternative (as described on pages 3-299 and 5-37) would exclude habitat either within or above the Project. The Staff Alternative is also unclear as to whether only fall Chinook are proposed for reintroduction. The Staff Alternative anadromous fish reintroduction studies, as described in many places, refer only to fall Chinook, but coho and steelhead are also mentioned in one place (DEIS page 5-37, line 47). Restricting reintroduction to one reach and one species would be arbitrary in light of substantial information in the ALJ’s Decision regarding suitable habitat as noted previously. Further, while the DEIS 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.

The DEIS conclusion did not consider that 58 miles is a reasonable estimate of the amount of useable habitat currently in the Project reach (ALJ Decision at 86, UFOF 8). The ALJ found habitat in the Project reach to include: 1) The main stem (containing approximately 28 miles of suitable habitat), which PacifiCorp admits is suitable for anadromous fish; 2) perennial tributaries (containing approximately 12 miles of suitable habitat) and intermittent streams (containing approximately 18 miles of suitable habitat) (ALJ Decision at 66, FOF 6-9 through 6-14).

Of greater concern, while the DEIS acknowledges that restoration of anadromous fish passage to the more than 350 miles of historical anadromous habitat above Iron Gate Dam has the potential to increase anadromous fish populations and the DEIS also states that “Although much of (the habitat above Iron Gate Dam) is currently degraded, habitat in the Williamson and Wood rivers is reported to be in good condition, and substantial efforts are underway to restore habitat throughout much of the upper basin” (Page 5-36, line 17), the Staff Alternative does not necessarily provide for reintroduction upstream of Keno Dam. Full and equitable consideration of access to habitat above the Project must be a part of the DEIS. The ALJ found that expansive bottomland areas with abundant low-gradient channel, which are preferred salmon habitat, are more common in the Upper Klamath basin than the remainder of the Klamath system. Such areas are particularly extensive above Keno dam and Upper Klamath Lake, where spring-fed streams include the Williamson and Wood Rivers, smaller spring brooks flowing into these two rivers, Sprague River, and various streams (ALJ Decision at 33, FOF 6-9).

What is Needed to Complete the SDEIS Regarding an Anadromous Fish Restoration Assessment Plan

The FERC Staff Alternative does not include the preliminary Section 18 prescriptions for fish passage issued by the Services. If the DEIS is to include an anadromous fish restoration plan it needs to consider all anadromous species and the full range of historical habitat. The SDEIS needs to give comprehensive consideration to a passage alternative that adequately mitigates for blocked passage to all historical and currently suitable habitat above Iron Gate Dam for spring run Chinook, fall-run Chinook, coho, steelhead, and lamprey, consistent with the substantial, relevant information in the Services’ preliminary prescription administrative record and the ALJ’s Decision and record regarding habitat for these species. This analysis needs to include biological and economic benefits of access to the 58 mile of historical habitat in the Project reach and approximately 350 miles of historical habitat above Keno Dam.

The DEIS analysis assumes that current fishways are adequate for anadromous fish at J.C. Boyle Dam. They are not. J.C. Boyle Dam has fish screening and bypass systems in place but they do not conform to current criteria for resident and anadromous fish (ALJ Decision at 29, FOF 4-8). The seals at the J.C. Boyle Dam have rendered the fish screens partially ineffective, allowing fish to be entrained in the turbines (ALJ Decision at 29, FOF 4-9). The SDEIS should consider the need for a downstream fishway to current criteria at J.C. Boyle Dam.

Habitat Upstream from Iron Gate Dam: “Passage over Iron Gate, Copco No. 1 and J.C. Boyle dams would provide access to 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 spawners, respectively.

Restoring passage to one or more of these reaches would alleviate fish crowdingand could provide a substantial increase in anadromous fish production” (page 5-37, line 39).....”Providing passage to any of these three reaches would also provide access to substantial tributary habitat that is suitable for spawning and rearing of steelhead and coho salmon (page 5-37, line 45).”

Facts and Adequacy of Analysis: While the Services have not yet provided our own estimates of Chinook production within and above the Project, the DEIS estimates of adult fall Chinook that could be accommodated by habitat in the Project reaches do not account for fall Chinook that could be accommodated by the more than 350 miles of historical habitat above Keno Dam (Huntington 2006) or other anadromous species. The ALJ found that Chinook salmon (both spring and fall-run) were abundant in the tributaries of Upper Klamath Lake (ALJ Decision at 12, FOF 2A-4) and that historically anadromous steelhead trout extended up to and used tributaries of Upper Klamath Lake (ALJ Decision at 24, FOF 2C-2). Use of the expansive, preferred salmon habitat in this region (ALJ Decision at 33, FOF 6-9) would significantly increase estimates of production that could be accommodated in habitat that is blocked by Project facilities and should be included in the analysis.

The ALJ also found that access to habitat in the Project reach would benefit lamprey by providing it with additional spawning and rearing grounds (ALJ Decision at 86, UFOF 10); and that steelhead will likely find suitable spawning and rearing habitat in the Project-bound area (ALJ 33, FOF 6-4).

The Staff Alternative is unclear whether it includes provisions for reintroducing anadromous fish to more than one reach if study results are encouraging. A restriction to one reach would be arbitrary and inconsistent with substantial, relevant information in the ALJ’s Decision and record as well as the stated Goals and Objectives of the Services. If the reach evaluation as proposed in the Staff Alternative shows the most promise being a Project reach without adequate fishways to habitat above Keno Dam, access to hundreds of mile of potential habitat will not be realized.

The DEIS preferred alternative needs to provide more detailed analysis of benefits to coho, steelhead, and Pacific lamprey. A restriction to fall Chinook salmon alone would be arbitrary and inconsistent with substantial, relevant information in the ALJ’s Decision and record as well as the stated Goals and Objectives of the Services.

What is Needed to Complete the SDEIS Regarding analysis of Habitat Upstream from Iron Gate Dam

The SDEIS needs to give comprehensive consideration to a passage alternative that adequately mitigates for blocked passage to all historical and currently suitable habitat above Iron Gate Dam for spring run Chinook, fall-run Chinook, coho, steelhead, and lamprey, consistent with the substantial, relevant information in the Services’ preliminary prescription administrative record and the ALJ’s Decision and record regarding habitat for these species. This analysis needs to include biological and economic benefits of access to the 58 mile of historical habitat in the Project reach and approximately 350 miles of historical habitat above Keno Dam.

5.2.7 Fish Disease Management

The DEIS conclusion regarding disease problems in the Klamath River downstream of the Project is based on observations for only late outmigrant fall-run Chinook juveniles and is overstated. It is inappropriate to take observations of disease for one run over a two years time frame and apply this interpretation to other species and to earlier outmigrating fall Chinook. The level of effect of disease even on fall Chinook salmon populations in the Klamath basin remains unknown. Future habitat improvement may result in substantial reduction in disease incidence in the Lower Klamath River. The DEIS does not adequately analyze all approaches to reducing the incidence of disease downstream of Iron Gate Dam.

Infection Rates in 2004 and 2005 and Outmigrant Mortality: High infection rates of *C. shasta* and *P. minibicornis* observed in juvenile fall Chinook migrants in 2004 and 2005, and mortality rates observed during juvenile outmigration monitoring, indicate that losses of juvenile migrants may be having a substantial effect on fall Chinook salmon populations in the Klamath basin. (page 5-38, line 10)

Facts and Adequacy of Analysis

The DEIS conclusion 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 is overstated and incorrect. Within the Klamath River system, fall-run Chinook are not the only anadromous fish and their vulnerability to disease does not apply to all anadromous fish species. Steelhead trout, coho salmon, and Pacific lamprey are also present. Steelhead trout are resistant to the main disease concern, *C. shasta* (ALJ Decision at 22, FOF 2B-18). Coho are more resistant than Chinook salmon (ALJ Decision at 23, FOF 2B-19). The timing of outmigration for reintroduced spring-run Chinook salmon would likely occur early in the year, minimizing exposure to *C. shasta*. The vulnerability of Pacific lamprey to *C. shasta* and other diseases is unknown.

The level of effect of disease on fall Chinook salmon populations in the Klamath basin remains unknown. Despite the release of juvenile hatchery Chinook into the infection zone and in warmer months of the year, these releases result in adult returns. Wild fall-run Chinook from Bogus Creek and the Shasta River outmigrate relatively early in the year, many avoiding warmer water periods in the spring and associated higher disease exposure.

The high incidence of disease in 2004 and 2005 for fall-run Chinook and apparent mortality is not indicative of mortality for all fall-run Chinook and is not indicative of mortality to other anadromous fish species. The year 2005 is a particularly poor year to use as an indicator for fall-run Chinook mortality. A statistical 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 4 other years of record were lower, 1981, 1991, 1994, and 1992 (Sharon Campbell, USGS, pers. comm.). Low flows generally correspond with higher temperatures and thus increased *C. shasta* incidence. In 2006, a high flow year, indications are that levels of *C. shasta* infection were delayed and remained low through early May (Scott Foott, USFWS, pers. comm). Thus, Chinook juveniles outmigrating prior to this time, as most wild fish do, likely had a low level of infection.

Flow management may have a positive influence on fall Chinook disease in future years. Flow management remedies that disrupt the life cycle of the polychaete host for both *C. shasta* and *P. minibicornis* will potentially be included as license conditions or other management.

What is Needed to Complete the SDEIS

The SDEIS needs to be revised to adequately analyze mainstem (below the Project) conditions for disease on earlier migrating wild fish (rather than primarily hatchery fish), reintroduced spring-run Chinook, steelhead, coho salmon, Pacific lamprey, and on all fish in wet and dry years.

Future Disease Related Mortality of Juveniles and Adults: The general trend toward warmer water temperature in the Klamath watershed could increase the disease related mortality of both juveniles and adult migrants in the future and contribute to a continued decline in the fishery for fall Chinook salmon. (page 5-38, line 20)

Facts and Adequacy of Analysis

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. Wild Chinook outmigrants from spring-fed creeks such as Fall Creek, Bogus Creek, and the Shasta River would enter the mainstem primarily in February and March ((Coots 1954); Tom Shaw, USFWS, pers. comm.), thus minimizing exposure to elevated temperature regimes and disease risk. 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. There is no evidence that the adult Chinook die off in 2002 in the Klamath River was associated with any long term water temperature trends or disease trends.

For other species, such as juvenile steelhead which can tolerate water temperatures up to 26°C (U. S. Environmental Protection Agency 2003) and are resistant to *C. shasta*, we see little near term disease risk in the Klamath watershed.

What is Needed to Complete the SDEIS

The SDEIS needs to be revised to adequately analyze mainstem (below the Project) conditions for disease on earlier migrating wild fish (rather than primarily hatchery fish), reintroduced spring-run Chinook, steelhead, coho salmon, Pacific lamprey, and on all fish in wet and dry years.

Expense of Dam Removal and Urgency of the Disease Situation: “[B]ecause of the substantial costs for dam removal and due to the urgency of the disease situation in the Lower Klamath River,” other approaches to reducing the incidence of disease downstream of Iron Gate Dam through a disease monitoring and management plan are preferred (page 5-38, line 33). “If disease issues are not addressed effectively within the next several years, there is a risk that the fall Chinook fishery could suffer a further, dramatic decline, and that an increased prevalence of disease pathogens may affect other salmonid species including the federally listed coho salmon ESU.”(page 5-38, line 38)

Facts

We concur that there is an urgent need to remedy the situation. However, the DEIS provides no clear indication that an increased prevalence of disease pathogens may affect salmonids other than late outmigrating fall-run Chinook. Again, coho salmon are more resistant than Chinook salmon (ALJ Decision at 23, FOF 2B-19). The DEIS does not provide any analysis or examples from other river systems showing that a disease monitoring and management plan would be an effective remedy.

Adequacy of Analysis

The DEIS determines that dam removal, based on limited information, is too expensive to consider as an alternative. The DEIS goes on to state that due to the urgency of the disease situation in the lower Klamath River, evaluation of 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 is the staff alternative. However, no analysis is provided of the likelihood of implementation of a plan, or the costs or time frame for the disease monitoring and management plan versus dam removal or other mitigation. The impact of relying on the development and implementation of disease monitoring and management plan could lead to decades of inaction or ineffectiveness associated with an increasing disease problem for Klamath River fall-run Chinook salmon.

What is Needed to Complete the SDEIS

The SDEIS needs to provide analysis regarding the prevalence of disease pathogens in salmonids other than late outmigrating fall-run Chinook. These analyses need to include steelhead and the federally listed coho salmon. The SDEIS needs to provide analyses or examples from other river systems showing that that a disease monitoring and management plan would be an effective remedy.

Regarding any plan for disease monitoring and management, the SDEIS needs to include analysis of the flows necessary to dislodge attached algae, the flows necessary to expedite fish movement, and the spill flows necessary to increase DO levels and reduce fish stress during fall Chinook outmigration or spawning. The analysis needs to include whether these flows are available, whether Reclamation might be a party to such plan, and the costs and benefits. These costs and benefits need to be compared to those of dam removal or other mitigation alternatives.

The SDEIS needs to be revised to analyze the likelihood of a disease monitoring and management plan being implemented and effective in reducing disease losses in a shorter time frame than dam removal or other mitigation alternatives.

The SDEIS needs to be revised to compare the costs of dam removal or other mitigation with the costs of continued disease impacts to fall-run Chinook salmon, the costs of potential commercial Chinook fishery closures, and losses to other associated fisheries. The basis needs to be provided for the SDEIS conclusion that dam removal, other mitigation, or enhancements are too expensive.

The SDEIS needs to be revised to analyze the level of risk that the fall Chinook fishery would suffer a further, dramatic decline with Iron Gate and Copco 1 dams in place versus the level of risk with disease monitoring and management plan.

5.2.8 Resident Fish Passage

Current Klamath Project operations affect resident trout populations and interfere with the complete expression of natural and necessary life history strategies for resident trout. There is only minimal discussion regarding rainbow redband trout, their life history needs, or their migration requirements. The DEIS does not consider the need for resident trout migration and access to important habitat.

Resident Trout Passage at Iron Gate, Copco 2, Copco 1, and J.C. Boyle Dams: The DEIS does not analyze passage for resident trout at Iron Gate, Copco 2, or Copco 1 dams. Minor modifications at J.C. Boyle ladder are proposed but there are not plans to rebuild the ladder to meet current criteria for native trout or endangered sucker species. FERC staff made this decision based on the following points:

- a. The ladder worked initially after J.C. Boyle Dam and ladder was built in 1959. (page 5-39, line 36)
- b. PacifiCorp proposes to re-grade the ladder to address what FERC staff perceives as the only condition that has changed since the ladder was built. (page 5-40, line 12)
- c. Fish below J. C. Boyle Dam have access to bypass reach and Shovel Creek to spawn while fish in the Keno reach have access to Spencer Creek. (page 5-40, line 14)

Facts

There are no upstream or downstream fishways at Iron Gate, Copco 2, or Copco 1 dams. Design, maintenance and operational problems with the ladder at J.C. Boyle Dam have impeded trout migration for many years (USDI Fish and Wildlife Service 2004) and the Copco and Iron Gate dams have completely eliminated upstream migration through those areas. Trout also migrate downstream, which may result in impacts at the poor or non-existent passage facilities at Project Dams. J.C. Boyle Dam has fish screening and bypass systems in place but they are only partially effective (USDI Fish and Wildlife Service 2004) and do not conform to current criteria for resident and anadromous fish (ALJ Decision at 29, FOF 4-8). The seals at the J.C. Boyle Dam have rendered the fish screens partially ineffective, allowing fish to be entrained in the turbines (ALJ Decision at 29, FOF 4-9). Such barriers may cause the extinction of mobile life history forms of resident trout, and if these life history forms are genetically distinct, their genetic contribution to the population will be lost (Young 1995).

While the DEIS acknowledges on page DEIS 3-312 (line 17) that implementing fish passage would help improve connectivity among populations in the Project area, there is only minimal discussion regarding rainbow redband trout, their life history needs, or their migration requirements. The findings of the ALJ clearly show that the Project contains habitat for resident trout (ALJ Decision at 26, FOF 3-1); that prior to the construction of dams, redband trout within the Project area belonged to a single, large intermixing population throughout the Klamath River Basin (ALJ Decision at 26, FOF 3-4), and that migration is one of several defining life history characteristics of trout (ALJ Decision at 27, FOF 3-7). The findings of the ALJ also show that life history strategies (such as spawning above the J.C. Boyle Dam) are denied to the resident

trout population below the dam (ALJ Decision at 26, FOF 3-6); the Project restricts migration of resident fish within the mainstem and into and out of the tributaries (ALJ Decision at 27, FOF 3-8), including highly productive spawning and rearing habitat in Spencer Creek (ALJ Decision at 27, FOF 3-13); that the lack of fishways at Iron Gate, Copco I, and Copco II dams block all upstream passage, isolating resident fish from counterparts below the dams (ALJ Decision at 27, FOF 3-8); and the Project's limitation on riverine migration may have reduced the genetic diversity of the remaining stocks within the Project reaches (ALJ Decision at 28, FOF 3-16). Improvements in the efficiency of the fishway at J.C. Boyle Dam would result in significant trout population migration above the dam over time (ALJ Decision at 27, FOF 3-12).

Adequacy of Impact Analysis:

The DEIS does not adequately describe or analyze these impacts to resident fish resources and does not analyze alternatives which address the need of resident fish for upstream and downstream passage at all Project facilities, including Copco 1, Copco 2, and Iron Gate dams.

What is Needed to Complete Analysis for the SDEIS

The SDEIS needs to adequately describe and analyze impacts to passage for resident fish resources, in particular rainbow/redband trout, due to the Project and its operations.

Upstream Migration: The SDEIS needs to give full and equal consideration to an alternative that adequately mitigates for the loss of upstream migration to resident fish resources. The findings of the ALJ clearly stated that Spencer Creek is a highly productive spawning and rearing habitat for rainbow/redband trout. The stock of rainbow/redband trout in the bypass and peaking reaches below J.C. Boyle Dam is denied the use of Spencer Creek and other suitable habitat upstream of the J.C. Boyle Dam (ALJ Decision at 27, FOF 3-13).

The channel work on the gradient for the approach to the J.C. Boyle ladder (DEIS page 5-40) is to bring the existing license into compliance and has been completed. This re-grading work is being inappropriately characterized as work the Applicant will do for the relicensing and apparently included in the cost of FERC's analysis for a new license (DEIS page 5-40). Without adequate testing of the success of fish passage since this re-grading, there is little basis for concluding that the upstream fishway would be adequate over the term of a new license.

A Service engineer has concluded that a new ladder constructed to current criteria is required to provide adequate passage for resident trout at J.C. Boyle Dam (USDI Fish and Wildlife Service 2005b). Improvements in the efficiency of the fishway at J.C. Boyle Dam would result in significant trout population migration above the dam over time (ALJ Decision at 27, FOF 3-12). The Staff alternative needs to adequately analyze, over the term of a new license, the benefits of an upstream fishway constructed to current criteria for resident trout at J.C. Boyle Dam and the benefits of upstream fishways for resident trout at Copco I, Copco II, and Iron Gate dams.

Downstream Migration: The SDEIS needs to give full and equal consideration to an alternative that adequately mitigates for the loss of downstream migration to resident fish resources. The findings of the ALJ clearly show that a) J.C. Boyle, Copco, and Iron Gate reservoirs support populations of resident fish, including trout and federally listed suckers (ALJ Decision at 28, FOF 4-1); b) that the migration of resident trout is adversely affected due to the hydraulics at the

Project dams and mortality related to unscreened flow resulting in fish passage through Project Dam turbines (ALJ Decision at 28, FOF 3-15); c) that “several tens of thousands of these fish are entrained annually” at each of the Project facilities (ALJ Decision at 28, FOF 4-3); d) that fish moving through more than one powerhouse could be exposed to potential cumulative mortality (ALJ Decision at 29, FOF 4-4); e) that once entrained, the fish face a high risk of mortality (ALJ Decision at 29, FOF 4-5); f) that entrainment mortality removes fish that would otherwise add to the population base downstream of the Project dams (ALJ Decision at 29, FOF 4-6); and g) that Iron Gate, Copco 1, and Copco 2 dams are not equipped with fish screens or downstream bypass facilities to minimize fish entrainment (ALJ Decision at 29, FOF 4-7).

In particular, J.C. Boyle Dam has fish screening and bypass systems in place, but they do not conform to current criteria for resident and anadromous fish (ALJ Decision at 29, FOF 4-8). The seals at the J.C. Boyle Dam have rendered the fish screens partially ineffective, allowing fish to be entrained in the turbines (ALJ Decision at 29, FOF 4-9). An Electric Power Research Institute (EPRI) report indicates that entrainment mortality at hydro Projects using Francis turbines (such as J.C. Boyle) with operational head greater than 335 feet ranged from 33 to 43 percent (ALJ Decision at 29, FOF 4-10). In light of the large percentage of river flow that is diverted into the J.C. Boyle power canal, the operation of Francis turbines, and the high operational head of 440 feet, fish mortality from entrainment at the J.C. Boyle facility is likely in the higher end of the mortality range as described in the EPRI report (ALJ Decision at 30, FOF 4-11).

The ALJ also found that losses of juvenile trout through entrainment at the Project could, in the long run, adversely affect trout abundance and distribution (ALJ Decision at 32, FOF 4-25).

The SDEIS needs to adequately analyze benefits of downstream fishways for resident trout at Copco I, Copco II, and Iron Gate dams and the benefits of a downstream fishway constructed to current criteria for resident trout at J.C. Boyle Dam.

Spring and Fall Creeks: Fishways at these facilities were excluded in the DEIS preferred alternative despite the fact that PacifiCorp proposed to construct fish ladders and screens at the Spring and Fall Creek diversions to provide passage for and to protect resident trout from turbine injuries. FERC staff excluded these protective measures for the following reasons:

- a. Two non-Project diversions and a high gradient reach may limit upstream passage in Spring Creek and fish may not be able to return upstream. (page 5-40, line 37)
- b. There is little indication that diversion of trout into the Spring Creek canal is impacting the population given the relatively high catch per unit effort observed upstream of the diversion and fish diverted into the canal have suitable habitat in the earthen canal. (page 5-40, line 42)
- c. While fish diverted into Fall Creek have the potential to be entrained and killed at the turbines, trout populations upstream and downstream of the diversion appear healthy based on the relatively high catch per unit effort both upstream and downstream of the diversion. (page 5-40, line 47)

Facts and Adequacy of Impact Analysis:

The development located within the Spring and Fall Creek tributaries also lacks any form of fishway. To address this impact, PacifiCorp proposes to install screens and ladders on the

Spring and Fall Creek canals and diversions. However, based on relatively high catch rates of trout in portions of both Spring and Fall Creeks, the DEIS concludes safe, timely, and effective fish passage is not warranted. This rationale, which ignores both Oregon and California state regulations, contradicts the DEIS approach to resident fish passage between the mainstem California facilities. As noted previously, in the Copco 2 bypassed reach, relatively low catch rates of trout and a lack of suckers (page 3-173), appear to justify eliminating resident fish passage from the DEIS analysis.

The impact caused by blocked access cannot be adequately calculated by the results of limited fish surveys. Such surveys are particularly uninformative when, regardless of results (high or low catch rates), the DEIS would reach the same conclusion: no need for resident fish passage facilities. 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 a well designed entrainment study. PacifiCorp choose not to perform comprehensive 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.

What is Needed to Complete Analysis for the SDEIS

Upstream Passage: The SDEIS needs to give full and equal consideration to an alternative that adequately mitigates for the loss of upstream migration to resident fish resources in Fall and Spring creeks. The Staff Alternative needs to adequately analyze the benefits of an upstream fishways for resident trout at the Spring Creek and Fall Creek diversion dams.

Downstream Passage: The SDEIS needs to give full and equal consideration to an alternative that adequately mitigates for the loss of downstream migration to resident fish resources in Fall Creek and Spring Creek.

5.2.9 Hatchery Management

Development of a Hatchery Genetics Management Plan (HGMP) is critical to future hatchery management and operation. The DEIS needs to adequately analyze alternatives to mitigating impacts of the Project with and without a HGMP.

Hatchery Management and Operation: “A more balanced strategy of releasing both subyearling smolts and yearling fall Chinook may provide more consistent adult returns and prevent a severe decline if several consecutive years of poor spring migration conditions were to occur. Releasing a substantial portion of hatchery-produced fall Chinook salmon as yearlings, which are released in November when water quality conditions are more favorable, would reduce the potential for hatchery fish to be exposed to disease, consequently reducing the potential for a severe decline in adult returns.” (page 5-41, line 40)

“Resumption of the yearling release program is a critical step towards ensuring a sufficient number of adult fall Chinook return to meet egg take and production targets in future years. It is appropriate for PacifiCorp to fully fund the yearling portion of the hatchery program, including the refurbishment, operation and maintenance of the Fall Creek rearing facility. The costs of this measure are warranted”. (page 5-41, line 44)

“It is appropriate for PacifiCorp to fully fund current operations and periodic upgrades at IGH. The costs of this program are warranted.” (page 5-42, line 14)

“Marking of hatchery released Chinook and coho can help reduce harvest mortality on wild fish and aid recovery and harvest management and reintroduction programs. Marking hatchery released steelhead would help fishery managers to distinguish between the effects of ocean mortality and residualization on low steelhead return rates. (page 5-42, line 43) It is appropriate for PacifiCorp to fully fund marking of 100 percent of released fall Chinook and coho. Marking of steelhead would be the responsibility of CDFG.” (page 5-42, line 47)

“Development of a HGMP would provide structure for ongoing analysis of hatchery programs and recommendations for future hatchery management. (page 5-43, line 28) While it is PacifiCorp’s responsibility to fully fund the operations of the hatchery, the management of the fish released from the hatchery is the responsibility of CDFG (and others).” (page 5-43, line 33)

Facts

The supporting data underlying Staff DEIS Conclusions 1 through 4 above, are derived from information provided by many parties including CDFG, NMFS, the Service, and PacifiCorp. In general we concur with FERC Staff conclusions. There is a need for making a distinction between the development of a HGMP and the implementation of a HGMP, both of which are required under the ESA. As specified in the 4(d) rule of the ESA for Hatchery Genetic and Management Plans, CDFG and NMFS are developing a HGMP for Iron Gate Hatchery at this time. 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 IGH and the Applicant’s ability to meet mitigation responsibilities. Under the ESA, authorization for take is provided only on the condition that hatchery operations avoid jeopardy and maintain compliance through monitoring and evaluation of the hatchery impact on natural coho salmon stocks. This requires much more monitoring than simply counting the number of fish released from or returning to the hatchery; it will require implementation of an HGMP. Absent implementation of an approved HGMP, hatchery operations at IGH will not receive authorization under the ESA.

Adequacy of Impact Analysis:

The CDFG/NMFS Joint Hatchery Review Committee (2001) presents some of the concerns for IGH hatchery practices and policies that the HGMP must address. Specifically, the fishery scientists and hatchery managers reported a significant potential risk to naturally spawned coho salmon from the release of 5-6 million Chinook smolts. This concern is exacerbated by: 1) the paucity of abundance data to affirm whether the naturally spawned coho salmon population is at a critical or viable population level, and 2) a lack of genetic delineation for the upper Klamath River stock(s). The adverse ecological interactions of spawning hatchery origin fish with naturally spawned coho salmon must be addressed through implementation of the HGMP.

Implementation of the HGMP will require a significant level of funding. CDFG estimates that the cost of executing the provision of the HGMP will be an order of magnitude higher than the

FERC staff estimate of \$503,370 annually to prepare the HGMP (DEIS, page 5-43). Funding estimates need to include capital outlay for any additional conservation hatchery techniques mandated by NMFS pursuant to negotiations of an approved HGMP. Implementation of the HGMP would also likely include, but not be limited to: 1) an accurate adult census of natural salmonids, 2) the rate and contribution of hatchery strays to natural spawning stocks, 3) determining the rate of competition between hatchery and natural salmonids, 4) determining genetic characteristics of natural and hatchery coho salmon and steelhead stocks, 5) determining out-migration timing of hatchery and natural stocks, 6) maintaining Tribal trust and Resource Trustee obligations to mitigate for lost habitat, 7) developing conservation hatchery techniques, and 8) minimizing any negative effects from fish husbandry or juvenile release on native, naturally occurring populations of listed salmonids. For a detailed description of the requirements of an approved HGMP, see Sections A-K, page 5-3 of the 4(d) rule of the ESA, available for review on the following website:
<http://www.nwr.noaa.gov/ESA-Salmon-Regulations-Permits/4d-Rules/upload/RevisedBinder2003August20.pdf>

Funding the execution of the tasks specified by the 4(d) rule of the ESA is not the responsibility of CDFG or the Agencies. Such funding is solely the responsibility of the entity (PacifiCorp).required to build and operate the hatchery as mitigation for Project impacts.

What is Needed to Complete Analysis for the SDEIS

In the SDEIS Staff Alternative, the FERC staff should clearly delineate and analyze PacifiCorp's funding responsibilities for implementing the HGMP. The ongoing research required by an approved HGMP will generally occur throughout the affected watershed, not just at the hatchery facility. Furthermore, the costs for implementing the HGMP need to be included in the appropriate alternatives.

5.2.10 Aquatic Habitat Enhancement

Proposed Measures to Modify Boyle Reach Irrigation Diversions: "PacifiCorp's proposed measures to modify irrigation diversions would provide a substantial benefit to the high quality trout fishery in the J.C. Boyle bypassed and peaking reaches, and we include these proposed measures in the Staff Alternative." (page 5-44, line 15)

Facts

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.

Adequacy of Impact Analysis:

While we assume that the screened pump diversion system will withdraw water from the Klamath River; no information is provided to confirm the 15 cfs addition to Shovel Creek estimated during irrigation season.

What is Needed to Complete the SDEIS

The SDEIS needs to clearly identify the alternative to the current irrigation system and source of water. The SDEIS needs to specify how fish in the source water would be protected. The SDEIS needs to 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.

5.2.11 Aquatic Resource Monitoring

Monitoring: “All available information indicates that the trout fisheries in the Keno and J.C. Boyle peaking and bypassed reaches are in good condition. Because we see no reason to expect that any of the proposed changes in operation would adversely affect these fisheries, we conclude that monitoring riverine fish populations and monitoring fish migration and movement every 3 years as recommended by FWS and Oregon Fish & Wildlife is not justified.” (Page 5-45, line 14).

Facts and Adequacy of Impact Analysis

The DEIS concludes that the trout fisheries in the 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. Contrary to this conclusion, the ALJ found that Project operations have and continue to adversely affect the resident trout fishery by, among other things: a) confining the resident trout between the Project dams and associated reservoir thereby impairing their utilization of the full range of life history strategies and spawning productivity; b) unscreened flow through Project turbines result in mortality of juvenile and adult trout migrating down stream; and c) the inability to effectively migrate adversely affects the genetic health and long term survival of the resident species (ALJ Decision at 87, UFOF 6). Further, the ALJ 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” (ALJ Decision at D-14, Ruling 59), stating that “other factors should be examined before subjectively declaring a fishery is ‘high quality.’ Fishermen would also consider such factors as how often fishing is permitted and what size fish are being caught” (ALJ Decision at D-14, Ruling 59). The ALJ went on to reject the argument that peaking reach trout were larger and found that for trout residing below J.C. Boyle Dam, on average the length has decreased from about 12 inches to about 7 inches since the facility was completed (ALJ Decision at D-20, Ruling 83).

The DEIS does acknowledge on page 3-312 (line 17) that implementing fish passage would help improve connectivity among populations in the project area. The findings of the ALJ clearly support this conclusion in that prior to the construction of dams, redband trout within the Project area belonged to a single, large intermixing population throughout the Klamath River Basin (ALJ at 26, FOF 3-4), and that migration is one of several defining life history characteristics of trout (ALJ Decision at 27, FOF 3-7). The findings of the ALJ also show that life history strategies (such as spawning above the J.C. Boyle Dam) are denied to the resident trout population below

the dam (ALJ Decision at 26, FOF 3-6); the Project restricts migration of resident fish within the mainstem and into and out of the tributaries (ALJ Decision at 27, FOF 3-8), including highly productive spawning and rearing habitat in Spencer Creek (ALJ Decision at 27, FOF 3-13); that the lack of fishways at Iron Gate, Copco I, and Copco II dams block all upstream passage, isolating resident fish from counterparts below the dams (ALJ Decision at 27, FOF 3-8); and the Project's limitation on riverine migration may have reduced the genetic diversity of the remaining stocks within the Project reaches (ALJ Decision at 28, FOF 3-16). Finally, the ALJ has ruled that improvements in the efficiency of the fishway at J.C. Boyle Dam would result in significant trout population migration above the dam over time (ALJ Decision at 27, FOF 3-12).

The DEIS does not adequately analyze the life history requirements and spawning productivity of resident trout consistent with the ALJ findings and the supporting record. The DEIS does not analyze the impacts of Project operations consistent with the ALJ findings and the record.

The intent of the Services' recommendation that monitoring of riverine fish populations and monitoring of fish migration and movement be conducted every 3 years is derived from the interest in populations of federally listed coho salmon. Coho salmon have a three year peak in abundance. Assessment of recovery of the entire population is often based on how well the largest cohort performs. If monitoring of riverine fish populations and migration and movement proceeds on a three year interval coinciding with the peak year of abundance of coho, aquatic resource monitoring will provide a meaningful and important index regarding the health of coho populations and progress towards recovery.

What is Needed to Complete the SDEIS

The DEIS needs to accurately characterize the trout fisheries in the Keno and J.C. Boyle peaking and bypassed reaches. The SDEIS needs to adequately analyze the life history requirements and spawning productivity of resident trout consistent with the findings of the ALJ. The SDEIS needs to adequately analyze the impacts of Project operations consistent with the findings of the ALJ. The SDEIS needs to analyze an alternative which includes monitoring able to discern changes in population responses of anadromous fish to non passage related measures.

Monitoring Frequency: Monitoring riverine fish populations in project-affected reaches at 5-year intervals should be sufficient to assess population responses to changes in instream flow or passage-related measures, and this frequency could be reduced to every 10 years after the second survey, by which time fish populations should have stabilized. (Page 5-45, line 19)

Facts and Adequacy of Impact Analysis

See comments on the intent of the Services' recommendation for 3 year frequency for monitoring of riverine fish populations and monitoring of fish migration and movement. Monitoring on a 5 year interval would not be adequate to assess population responses of coho salmon to changes in instream flow or passage related measures

What is Needed to Complete the SDEIS

The SDEIS needs to analyze an alternative in which monitoring proceeds on a three year interval coinciding with the peak year of abundance of federally listed coho salmon. The SDEIS needs to completely describe the scope of the fisheries monitoring that will be required in the license.

Monitoring Protocol: “We see little benefit in monitoring the number, size, and sex of spawning redband trout in Scotch, Camp, Shovel, Long Prairie, and Spencer creeks, as FWS recommends, because spawning habitat in these creeks is not affected by project operations.” (Page 5-45, line 40),

Facts and Adequacy of Impact Analysis

We do not concur with your 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 (DEIS, 5-45, lines 40-43). In fact, 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. Again, several ALJ findings from the Energy and Policy Act hearings confirm this position, and these are listed as follows: 1) Prior to the construction of the dams, redband trout within the Project area belonged to a single, large, intermixing population throughout the Klamath River Basin. (ALJ Decision at 26, FOF 3-4); 2) Although the trout sport fishery is robust in the Upper Klamath Basin, the juvenile trout from above J.C. Boyle Dam in the Oregon portion of the Klamath River are actually decreasing. (ALJ Decision at 26, Finding 3-5); 3) Life history strategies (such as spawning above the J.C. Boyle Dam) are denied to the resident trout population below the dam. (ALJ Decision at 26, FOF 3-6); 4) Migration is one of several defining life history characteristic of trout. Their ability to migrate is one of several evolutionary advantages contributing to survival of trout in the Klamath River for millions of years through dramatic environmental changes. (ALJ Decision at 27, FOF 3-7); 5) The Project restricts migration of resident fish within the main stem and into and out of tributaries. Iron Gate, Copco I, and Copco II Dams do not have fishways and currently block all upstream fish passage. Thus, the stocks above Iron Gate are isolated from counterparts in the lower basin. Further, the stocks between each of Iron Gate, Copco I, and Copco II Dams are similarly isolated. (ALJ Decision at 27, FOF 3-8); 6) Spencer Creek is a highly productive spawning and rearing habitat for rainbow/redband trout. The stock of rainbow/redband trout in the bypass and peaking reaches below J.C. Boyle Dam is denied the use of Spencer Creek and other suitable habitat upstream of the J.C. Boyle Dam. (ALJ Decision at 27, FOF 3-13); 7) Downstream migration of rainbow/redband trout is also adversely impacted because of the Project dams. This is due to the hydraulics at the Project dams and mortality related to unscreened flow resulting in fish passage through Project dam turbines. (ALJ Decision at 28, FOF 3-15); and 8) The Project’s limitation on riverine migration may have reduced the genetic diversity of the remaining stocks within the Project reaches. (ALJ Decision at 28, FOF 3-16).

What is Needed to Complete the SDEIS

The DEIS needs to adequately analyze monitoring of the number and size of spawning redband trout in Scotch, Camp, Shovel, Long Prairie, and Spencer creeks.

Anadromous Fish Monitoring: “If a program to restore anadromous fish to habitat upstream of Iron Gate Dam is undertaken, it would be beneficial for PacifiCorp to include the monitoring of anadromous fish populations as a component of the anadromous fish restoration plan that we discuss in section 5.2.6, Anadromous Fish Restoration, which would include most of these elements.” (Page 5-46, line 11)

The Services concur that the license should include conditions requiring the monitoring of anadromous fish populations as a component of an anadromous fish restoration plan. The DEIS does not completely describe the scope of the fisheries monitoring that will 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 (DEIS, page 5-7).

Fishway Monitoring: “Information collected on the number and species of fish that are passed or transported via any fish passage facilities that are constructed should provide sufficient information on the status and trends of reintroduced populations.” (Page 5-46, line 15)

Facts and Adequacy of Impact Analysis

Monitoring of numbers of fish at fishways only 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. For one, the intent of upstream fishways is primarily to provide access to spawning areas, including tributary streams. If fish are suffering mortality subsequent to the use of ladders and fail to make it to spawning tributaries, managers would have no way of knowing this with monitoring at fishways alone. See comments on Aquatic Resource Monitoring Conclusion No.8 above.

Further, monitoring that can identify the origins and history of individual fish is necessary to assess the overall fate of anadromous fish outmigrating through the Project and returning as adults. Passive Integrated Transmitter (PIT) tagging on the Columbia River has enabled these evaluations and comparisons of different paths of migrating fish through hydropower facilities (Budy et al. 2002; Fish Passage Center and Comparative Survival Study Oversight Committee 2006; Marmorek et al. 2004). This technology 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.

The DEIS 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 as adults. The DEIS 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.

What is Needed to Complete the SDEIS

The SDEIS needs to analyze the value assessing the overall fate of anadromous fish outmigrating through the Project and returning as adults. This PIT (or similar) technology gives both anadromous fish and water managers the tools needed to make informed decisions regarding

Project operations, power generation, and the migration of restored fish runs on the Klamath River.

5.2.12 Vegetation Management

Both federal and state laws require landowners to manage noxious weeds within their ownerships. An integrated approach to noxious weed management on all noxious weed species and across ownership boundaries is the most effective way to comply with these requirements. If a more limited approach is proposed, the environmental effects of that proposed management should be disclosed. The effects of the project on riparian vegetation, including the distribution and abundance of reed canary grass, should be disclosed and discussed regardless of any value judgments on those effects.

5.2.13 Wildlife Management

We generally concur with the DEIS analysis. We understand that only a small portion of Project lines do not meet raptor-safe guidelines and commend PacifiCorp for their efforts in this area. However, the potential for electrocution or collision at Project transmission lines cannot be ruled out (DEIS p. 87-88, Table 5-4), even though none have been documented to date. The SDEIS should include the cost of developing the wildlife habitat management plan in coordination with the bald eagle management plan. The SEIS should 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).

5.2.14 Recreational Resource Management

The Department notes that both the angling and whitewater boating opportunities analysis in Section 3 relied on several erroneous and oversimplifying assumptions. FERC calculated boatable flows using an overly restrictive assumption that boating flows would only be provided one day per week. This approach likely overestimated boating opportunities in extremely dry years and severely underestimated opportunities for average and wet years.

A model for estimating impacts of various flow scenarios was submitted to FERC in March 2006 (US Department of the Interior 2006). This model (BLM Flow Management Scenarios Model) is currently the most accurate and reliable method for estimating flow related impacts to boating. The model, as amended and improved during the Klamath hearing proceeding, should be used to revise FERC's analysis of whitewater boating impacts. During the hearing proceeding PacifiCorp and BLM agreed on a set of model outputs for describing boating impacts for three representative water years (Turaski Ex 5, page 1).

Similar problems with FERC's analysis of fishing opportunities in the bypass reach and peaking reaches are detailed in the specific comments section. FERC failed to conduct an adequate analysis of the impacts to fishing opportunities by basing its conclusions on an extremely narrow interpretation of the effects of flow on fishing opportunities. The DEIS should be revised to correct for these deficiencies and fully disclose the breadth of impacts and correlated benefits resulting from the various flow prescriptions.

5.2.15 Aesthetic Resource Management

The Staff fails to include what measures will be implemented to improve aesthetic resources for the J.C. Boyle Bypass Canal. The BLM 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.

5.2.17 Cultural Resource Management

HPMP: “The HPMP for the project would provide direction and guidelines for management of historic properties within the new project boundary as proposed by PacifiCorp (its APE).” Page 5-53, Line 5 – 7.

“PacifiCorp should revise its HPMP to reflect the geographic area of historic property management for the project as determined by Commission staff and reflected in a new license and the additional measures that we recommend be addressed during project-related management of cultural resources, and we include this in the Staff Alternative.” Page 5-53, Line 44 – 47.

“We have reviewed and analyzed available information and conclude that the APE for relicensing this project appropriately encompasses (1) the entirety of the APE as delineated by PacifiCorp in its October 2004 draft HPMP and (2) that portion of the Klamath River from the Iron Gate dam to the confluence of the Scott River.” Page 5-53, Line 22 – 25.

Facts and Adequacy of Analysis

Cultural resources on BLM lands have been, and will continue to be, affected by the Project. PacifiCorp’s current HPMP does not include 18 National Register of Historic Places (NRHP) eligible sites located on BLM land within the J.C. Boyle Peaking Reach. The 18 sites that need to be included in the revised HPMP are: 35KL18, 35KL21/786, 35KL22, 35KL24, 35KL550, 35KL558, 35KL567, 35KL576, 35KL577, 35KL629, 35KL630, 35KL632, 35KL633, 35KL635, 35KL785, 35KL791, 35KL1083, and JC03-29. These sites are within the APE and are being affected by various Project-related activities. PacifiCorp notes that these sites are being affected by Project-related activities (PacifiCorp 2004b, Table 3.6-1 and Table 3.6-2). The Licensee has acknowledged impacts to BLM cultural sites within the APE resultant of public access and recreation (e.g., “*Some of these sites appear to be affected by Project operations and/or Project-related activities such as public access and recreation*” PacifiCorp 2004e, pg 3-1). Additional impacts to BLM sites within the APE identified by the Licensee include looting, vandalism, erosion, road and utilities development, livestock grazing, and camping (PacifiCorp 2004e, Tables 3.6-1 and 3.6-2).

Per an ALJ order dated August 14, 2006, five of the sites (35KL21/786, 35KL22, 35KL24, 35KL558, and 35KL577) will be the focus of detailed site-specific studies to determine if PacifiCorp’s flow operations are affecting cultural deposits. PacifiCorp will coordinate and consult with the BLM when it carries out these studies.

The FERC staff alternative directs PacifiCorp to revise its HPMP to include historic properties within the APE. This revised HPMP should include sites managed by the BLM.

Cultural Resource Survey: “The Bureau of Land Management specifies that PacifiCorp conduct archaeological surveys on about 77 acres of Bureau-managed land in the vicinity of Big Bend and along the peaking reach.” Page 5-53, Line 12 – 14.

“We also include the Bureau of Land Management’s measure to conduct archaeological surveys in areas that had not yet been surveyed as long as those areas are within our defined APE.” Page 5-53, Line 34 – 36.

Facts and Adequacy of Analysis

We generally concur with the DEIS analysis. The FERC staff alternative supports the BLM position regarding the need for cultural survey of 77.2 acres of BLM land within the J.C. Boyle Peaking Reach. All areas identified by the BLM as requiring cultural resource survey are within the APE as delineated by PacifiCorp in its October 2004 draft Historic Properties Management Plan (HPMP).

What is Needed to Complete the SDEIS for cultural resource management conclusions.

The SDEIS needs to adequately address the 18 NRHP eligible sites on BLM land within the APE. The BLM looks forward to reviewing PacifiCorp’s revised HPMP addressing project effects to these sites.

5.2.18 East and Westside Decommissioning

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.

5.2.19 Keno Development

Keno Dam Should Remain Part of Any New License

We maintain our position that Keno Dam should remain a part of any new license issued for Project No. 2082 and that the use of Link River Dam is critical to Project No. 2082. Section 3(11) of the FPA defines “project” to include ditches, dams, reservoirs, lands or interim lands the use or occupancy of which are necessary or appropriate in the maintenance and operation of the proposed power development (emphasis added). Further Section 23(b) defines projects under the FPA to be those operated for the purpose of “developing electric power.” As described in our mandatory conditions filed with FERC (the description of the relationship of Link River and Keno Dams to Project No. 2082) it is clear Keno Dam itself is part of Project No. 2082 and thus, should remain part of any new license issued for the Project. Further, the use of Link River Dam and the water released from it are critical to Project No. 2082. Link River and Keno Dams are upstream facilities that are necessary and appropriate for the operation of the downstream projects owned by PacifiCorp. While Link River Dam and Keno Dams are important to the management and operation of the Klamath Reclamation Project, it is equally important to PacifiCorp’s management and operation of its hydroelectric project. Contrary to PacifiCorp’s proposal to exclude both Link and Keno Dams from any new license for Project No. 2082, it is our analysis that even under the project as proposed by PacifiCorp, that PacifiCorp’s power

generation downstream of Keno Dam will be dependent on the operation of, and use of water from both 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 Project No. 2082.

Additionally, the recreation lands at Keno Dam are a part of Project No. 2082, and reside on lands under the jurisdiction of the Bureau of Reclamation. Under section 10(a)(1) of the FPA, the Commission is required to ensure that any project for which a license is issued will be best adapted to a comprehensive plan for improving or developing a waterway for a variety of beneficial uses, of which "the improvement and utilization of water power development" is only one. Section 10(a)(1) specifically includes the "*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. It is therefore appropriate to include within the project boundary Keno Dam, and those lands necessary for such project purposes served by Keno Dam.

The SDEIS Should Include Analysis of the Proposed Commission Decision to Remove Keno Dam

Additional analysis is required regarding the adverse affects of the proposed decision that Keno Dam does not remain jurisdictional. FERC has not analyzed the environmental consequences of the proposed removal of Keno Dam from Project 2082. There are a number of issues, some of which are mentioned in the DEIS, that must be considered in order to make an informed decision whether Keno Dam should be removed from the Project. Further, we are concerned that PacifiCorp, by proposing removal of Keno Dam from the license, and FERC's agreement to do so, relieves PacifiCorp of its responsibility to address certain critical issues regarding Keno Dam and its effect on the Klamath River. While it is our position that Keno should not be removed from the project, if FERC nonetheless decides to remove Keno, then FERC should condition the new license to address the necessary issues regarding Keno and PacifiCorp's obligations to properly remove it from the project.

In order to comply with NEPA requirements, impacts of any proposed action or alternative must be analyzed. All proposed alternatives in the Draft EIS include removing Keno Dam from the Project 2082 license, however; no analysis of environmental, social, economic, political, or technological consequences has been conducted. In order for FERC to be in compliance with NEPA requirements, FERC must complete an impact assessment of at least the following:

- 1) Future operations of Keno Dam once removed from FERC jurisdiction, including an assessment of entities responsible for long-term operation and maintenance costs and implementation.
- 2) Future State or Federal regulatory requirements, including water quality (TMDL's) if the dam is removed from FERC's jurisdiction and identification of a responsible party.
- 3) Any adverse affect on the operation of Reclamation's Klamath Irrigation Project.
- 4) Keno impoundment area and downstream water quality impacts if operations are modified from status quo.
- 5) Adverse affects to cultural resources as a result of changes to impoundment area water elevations.

- 6) Adverse affects to recreation at the Keno Recreation Area caused by changes in ownership, access, management, dam operations, and water levels in the impoundment area.
- 7) Adverse affects to fish and wildlife habitat due to operational changes, including operational capability of the Keno fish ladder.

Decommissioning Conditions

If, however, FERC's final decision is to remove Keno Dam from the new license; that is, allow PacifiCorp to surrender the facility, we request that FERC condition the surrender to ensure that PacifiCorp addresses any issues that are the result of its past operation of Keno, including any impacts on the Klamath River and its water quality.

Conditions of surrender should include at a minimum:

1. PacifiCorp completes a baseline water quality study, consistent with Reclamation requirements, to determine current water quality and TMDL issues, required remediation and mitigation, and associated costs.
2. PacifiCorp will create a fund to cover costs of remediation and mitigation of existing water quality and TMDL issues.
3. PacifiCorp will complete an analysis of cultural and archeological sites within the historic project boundary, including the Keno Reach, develop a Historic Properties Management Plan (HPMP), and provide funding to implement the HPMP to any entities that take title to lands or structures within the historic project boundary.
4. PacifiCorp to study and monitor sucker, coho, and redband trout passage at Keno Dam.
5. PacifiCorp to construct smolt recovery facility at Link River Dam.
6. Complete a Recreational Resource Management Plan that includes Keno Recreation Area ensure continued maintenance and public access to the boat launch, shoreline, Keno Dam, and the stretch of river below Keno Dam.

By contract with Reclamation, PacifiCorp is required to continue maintenance and operation (O&M) of Keno Dam as long as Project 2082 is in place. Under this contract, PacifiCorp will be required to continue O&M of Keno under the direction of Reclamation even if Keno is not included in the new license. PacifiCorp will only be removed from this obligation if Project 2082 is fully decommissioned.

Relicensing Conditions

We generally agree with the environmental measures proposed by staff in the DEIS in the event that Keno Dam remains within the new license (DEIS page 5-55, lines 13-25). Exceptions include the following:

- (1) Water quality management should also be explicitly required in measure 4P. 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. Clearly, water quality will be addressed at J.C. Boyle, Copco, and Iron Gate reservoirs, but possibly not Keno reservoir (measure 4P, page 5-2, lines 4-19). The Staff Alternative seems to be relying on the state's TMDL and Reclamation's CIP processes that address water quality at a larger scale to address water quality at Keno reservoir (page 3-155, lines 38-48 and page 3-156,

lines 1-11). However, these processes have different requirements and timelines, and there is no guarantee that water quality problems at Keno reservoir will be addressed. The water quality impacts of Keno reservoir will clearly continue after relicensing. Therefore, the water quality impacts of Keno reservoir need to be addressed by PacifiCorp, and Keno reservoir should be explicitly included in measure 4P, in the Staff Alternative.

- (2) Provisions for refilling Keno Reservoir when it is drawn down must ensure maintenance of flows below Keno and lake elevations pursuant to Reclamation's contract with PacifiCorp.
- (3) Additionally PacifiCorp should be required to complete and implement a Historic Properties Management Plan for the Keno Reach and evaluate the existing fish ladder and if appropriate modify the facility to accommodate upstream fish migration.

It is our view that all of these measures; that is, those proposed by staff and those proposed in our comments, should be required even if Keno Dam is not included in the new license, because the Applicant would retain ownership, and the identified impacts of Keno Dam would be continuing. These impacts should be addressed similar to that required under decommissioning.

PRELIMINARY DETERMINATION OF 10(j) CONSISTENCY

The U.S. Fish and Wildlife Service received your letter dated October 5, 2006, containing the Commission's preliminary determinations of 10(j) consistency with regard to our fish and wildlife recommendations that we submitted on March 27, 2006. In our review of the DEIS, dated September 25, 2006, we found a total of 36 of our recommendations listed in Tables 5-2 and 5-3 in the DEIS, of which 18 were adopted by FERC (17 if Keno is not included in the Project license). We appreciate your adoption of these recommendations.

We find that several of your preliminary negative determinations were made without the benefit of new information. We have provided a brief discussion of this information below and would be happy to provide additional details at your request during the scheduled 10(j) meetings in December. The majority of the scientific information was discussed in detail in the filing of our comments, preliminary terms, conditions, prescriptions, and recommendations (U.S. Department of the Interior 2006); and was presented by the Service and others in the exhibits and testimony provided to the Energy and Policy Act Hearings on the Klamath in August 2006 (Klamath Hearings). The ALJ findings of fact provide a concise synopsis affirming the validity of the Service's position. These findings are cited herein to streamline our comments.

Other negative determinations seem to be based on the effect of the recommendation on the profitability of the Project, rather than on an assessment of the Project's impacts on the environment and the mitigation necessary to address the adverse environmental impacts. Decisions based only on the costs to the Project are incomplete and arbitrary. While the Commission has provided information regarding the costs to the Project for implementing these recommendations, it has failed to present an analysis of the ongoing natural resource damage as a result of Project operations.

Individual recommendations are discussed in detail below.

Recommendation 5-3 #15 (6.3 from our letter), J. C. Boyle Bypassed Reach Flows

We disagree with your assessment on page 3-238, lines 15-18, that a release of 200 cfs into the J.C. Boyle bypassed reach would strike a reasonable balance between temperature and physical habitat needs for trout based on the following facts: 1) physical habitat availability would be greater with a higher release; 2) food availability would be greater with a higher release; 3) optimal temperature conditions for resident redband trout would occur with a higher release; 4) most other salmonids would not exist in the J. C. Boyle bypassed reach during the warmest periods when higher than optimal temperatures for them would exist; and 5) lack of immediate, complete mixing of the different temperature waters would provide for persistence of a very large, possibly 200-yard, area of cooler water (thermal refugia) for anadromous fish, should some exist in the area during the warmest time periods. Each of these facts are discussed in more detail, below.

1. Many of the 1-D PHABSIM habitat curves that were provided by PacifiCorp (PacifiCorp 2005a) and were used in the DEIS, show little or no response in habitat amounts with flow changes. We asked two instream flow experts, Dr. Stacy Li of NOAA Fisheries and Dr. George Robison of Oregon Department of Fish and Wildlife, to review PacifiCorp's PHABSIM model and they concur that PacifiCorp's 1-D model is flawed and should not be used to make flow recommendations (Li 2006; Robison 2006). They cite the modeling capability of the 2-D model that was provided by PacifiCorp in Addley and Allen (2005), and urge us to utilize a combination of flow assessment approaches. The 2-D analysis by Addley and Allen (2005) suggests that a flow of 800 cfs would be a good flow recommendation for the peaking reach (Li 2006). This is a slightly higher flow than proposed by BLM in the River Management Condition using a combination of approaches (minimum of 690 cfs at the peaking reach).

Even using the 1-D model curves would indicate, as stated at page 3-235, lines 37-40, that greater amounts of habitat would exist for juveniles at 650 cfs, for fry at 800 cfs, and for adults at 3,000 cfs. Flows that are closer to their natural levels would likely provide even greater habitat amounts for fish than indicated by the flow study habitat curves when the sidecast materials are removed and higher flows are provided over time. Clearly, releases in excess of your recommended 200 cfs would provide greater amounts of physical habitat for fish.

2. Food availability in the J. C. Boyle bypassed reach would be greater with higher flow releases because the water coming from J. C. Boyle Dam is higher in nutrients which support growth of periphyton and, in turn, higher concentrations of macroinvertebrate prey for fish (Gard 2006). In addition, four independent studies documented the impact of the low flows in the J.C. Boyle bypassed reach, such as low drift density and lower fish growth and survival than observed in the Keno reach, which has relatively better flow conditions.

(a) Addley et al. 2005 documented that macroinvertebrates, essential food resources for fish life, have been severely reduced by dewatering the channel. Macroinvertebrate drift data showed much lower drift density in the dewatered reach compared to the Keno reach above J.C. Boyle Dam. Drift density in July was 11 times higher in the Keno reach and 2.4 times higher in September than the J.C. Boyle bypassed reach. ((Addley et al. 2005), page 5). This dramatic difference in density does not include the much lower total productivity that results from less habitat area available due to lower base flow (about 6 times less flow than in the Keno reach in June, July, and August).

(b) The PacifiCorp Fish Resources Final Technical Report (PacifiCorp 2004c) documented that fish grow more slowly and exhibit reduced fish survival in the J.C. Boyle bypassed reach compared to the Keno reach.

(c) The City of Klamath Falls (1986) documented that Project operations in the J.C. Boyle bypassed reach negatively impact the redband trout fishery and habitat, including food availability (City of Klamath Falls 1986), fish production, and overall fish size. The City of Klamath Falls also documented changes in fish population structure in the J.C. bypassed reach with fewer trout observed over three years of age, smaller size at age, and macroinvertebrate drift data reflecting low flow conditions, thereby affecting redband trout growth and productivity.

(d) ODFW researchers (Oregon Department of Fish and Wildlife 2003) also documented that the minimum flows of 100 cfs in the J.C. Boyle dewatered reaches did not adequately provide for a healthy productive fish community, with reduced growth, low relative weights, and no survival of fish over age 4.

3. As discussed on page 3-238, first paragraph, your recommended release of 200 cfs at J. C. Boyle Dam provides optimal average water temperatures for most salmonids during the warmest time of the year. However, as you state on page 3-235, lines 32 and 33, redband trout in the Klamath Basin (eastern Oregon) are more tolerant of higher temperatures. Indeed, the optimal water temperature for growth of these eastern Oregon redband trout is above 19E C (Behnke 1992), which is the temperature, assuming complete mixing, that your analysis on page 3-238 suggests would occur in warm summer days under the BLM prescribed and resource agency recommended flows.

Even when using the lower general rainbow trout temperature optimums (13 to 16EC, Behnke 1992), Gard (2006) found that the compensating factor of increased drift and other factors would result in greater growth rates with the BLM prescribed discharge of 470 cfs rather than the 200 cfs recommended in the DEIS. The increases in growth would be even greater if the 19EC optimum indicative for eastern Oregon redband trout were used. There is no basis to reduce streamflow releases at J.C. Boyle to balance temperature against physical habitat needs as was done in the DEIS.

The DEIS treats reduced temperature from spring flow as an overriding factor in determining what flows should be released from J.C. Boyle Dam. However, Bartholow and Heasley (2005) show that increased releases from J.C. Boyle Dam will decrease water temperatures in the bypassed reach above the springs and increase water temperatures in the bypassed reach below the springs while providing more habitat. The DEIS completely ignores the impacts of streamflow on temperature for the 0.5-0.8 miles of stream upstream from the springs. Since this reach currently has temperature values closer to acute mortality for salmonids, more emphasis needs to be given to the mitigation effect of increased flows in this reach, rather than the lower 3.5-3.8 miles that would be moderated by the springs. According to Bartholow and Heasley (2005), upstream of the springs, the maximum stream temperature would be 26.9EC under a worst case climatic scenario for July at 100 cfs. This is in the range of acute mortality for normal rainbow trout, 24 to 27EC (Moyle 2002), and close to acute mortality for redband trout (28-29EC according to Behnke 1992). At 200 cfs, the temperature maximum value would be 26.3EC which provides only marginal improvement. At 450 cfs, which is near the BLM prescribed flow,

maximum stream temperatures would be 25.1EC, which is below the acute mortality threshold for rainbow trout (Bartholow and Heasley 2005).

4. With restoration of anadromous fish through this reach, adult salmon would migrate through the reach in the fall and winter to tributaries to spawn, while adult steelhead migrate through the spring months. Fry and juveniles would gradually move downstream, sometimes spending time rearing within the Project reaches. For example, the ALJ Decision at the Klamath Hearings found that “The record of evidence shows that juvenile Coho salmon begin outmigrating to the ocean in late February, and continue migration through early July. While juvenile Coho salmon rear in streams for one year and have a preference for cold water (ranging between 12 and 14° C), they can tolerate higher water temperatures (exceeding 20° C) where food is abundant, there are areas of thermal refugia, and other conditions are not stressful” (ALJ Decision at 36, FOF 7-11) and “Although water temperature in the summer above Iron Gate Dam is an issue, the record evidence shows that water temperature will not preclude Coho salmon from successfully utilizing the habitat within the Project area” (ALJ Decision at 36, FOF 7-12).

5. The ALJ agreed that the BLM releases would not degrade the beneficial cooling effect of the springs in the bypassed reach. He recognized that “The record evidence demonstrates that the BLM flow conditions would leave approximately a 200-yard thermal refugia area for use of anadromous fish. Further, in the J.C. Boyle bypass reach, springs would continue to offer a thermal refugia area for fish” (ALJ Decision at D-66, Ruling 252 and D-67, Ruling 255).

Given the new information described above, we request that you reconsider the Staff Alternative flow of 200 cfs in favor of the flows outlined in the BLM River Management Condition.

Recommendation 5-3 #19 (6.3) Ramp Rates at J.C. Boyle Powerhouse

We disagree with your assessment that there is “no evidence that stranding is limiting fish populations, which are comparable to some of the best trout waters in the region” and that a 2 inch per hour ramp rate would have “minimal benefit to trout populations” in the peaking reach (Federal Energy Regulatory Commission 2006b) because: 1) there is evidence of stranding of fish in the peaking reach; 2) there is evidence that peaking operations harm the resident trout population age structure, growth, and survival; and 3) the resident trout population is not comparable to some of the best trout waters in the region. These facts are discussed in detail below.

1) The Commission relied on PacifiCorp’s stranding survey as the basis for decision on this issue. However, the methods used in PacifiCorp’s stranding surveys were inadequate to detect stranded or trapped fry because they are difficult to detect and they can be depredated prior to detection (Anglin et al. 2006). Recent observations of fish stranding due to ramping in the peaking reach (Dunsmoor 2006) should be included in the discussion. Further, the testimony and exhibits presented and summarized in the findings from the Klamath Hearings should be incorporated into the DEIS. Finding 16-8 (ALJ Decision at 45) states that “PacifiCorp’s peaking operations cause high mortality to fish and other aquatic organisms through stranding.” Finding 16-9 (ALJ Decision at 46) states that “[O]n July 5, 2006, a severe stranding along 225 feet of the peaking reach was documented near Frain Ranch. ‘[A]bout 5,000 fish, more crayfish, and an order of magnitude more aquatic insects perished in a single peaking cycle...’ No redband trout mortalities were documented, however few trout fry exist in the peaking reach.” Finding 16-10

(ALJ Decision at 46) states that “[T]he severe loss of fish and other aquatic life on July 2006 is directly attributable to PacifiCorp’s peaking operations.” Finding 16-15 (ALJ Decision at 46) states that “Project peaking operations kill, through stranding, large numbers of young fish and aquatic invertebrates that are the primary prey food for trout.” Finding 16-18 (ALJ Decision at 47) states that “PacifiCorp’s mark-recapture studies did not mark or recapture any fry in the Oregon peaking reach; the area of peaking reach where peaking effects would be most pronounced.” The record contains substantial evidence documenting that stranding of fish occurs in the peaking reach.

2) The testimony and exhibits presented and summarized in the Klamath Hearings provide ample evidence that peaking operations harm the resident trout population age structure, growth, and survival in the peaking reach. Ultimate Findings of Fact and Conclusions of Law from the Klamath Hearings include: “Current Project operations, particularly sediment blockage at the J.C. Boyle Dam, the flow regime, and peaking operations, negatively affect the redband trout fishery. The proposed River Corridor Management Conditions would improve fishery resources” (ALJ Decision at 86, UFOF 14). Also, “The BLM’s proposed upramp rate will improve conditions for fish resources and other aquatic organisms by reducing adverse effects caused by the existing nine inch/hour upramp rate” (ALJ Decision at 87, UFOF 15). Other findings on impacts of peaking and high ramp rates on aquatic life summarized in the Klamath Hearings include: “Peaking is the most widely documented source of fish stranding. Peaking fluctuations can result in severe cumulative impacts to fish populations” (ALJ Decision at 45, FOF 16-7). “Peaking operations that cause high mortality likely only happen a few times a year, following the first peaking event after several months of steady flow” (ALJ Decision at 46, FOF 16-12). “Project peaking operations kill, through stranding, large numbers of young fish and aquatic invertebrates that are the primary prey food for trout” (ALJ Decision at 46, FOF 16-15). “Few fry have been captured in the Oregon section of the peaking reach; the section of the peaking reach with the highest ramp rates” (ALJ Decision at 47, FOF 16-17). “Flow fluctuations from peaking operations increase energetic demands on salmonids, decreasing energy available for overall health, growth, and reproduction” (ALJ Decision at 47, FOF 16-21). “Larger fish operate closer to the energetic margin, so energetic costs of peaking would be expected to reveal themselves in larger fish” (ALJ Decision at 48, FOF 16-23).

The Klamath Hearings also include record evidence and findings of fact regarding impacts of PacifiCorp’s peaking operations on macroinvertebrates, the primary food source for trout in the Klamath River. “Peaking operations reduce the production of sessile organisms, like macroinvertebrates, by ten (“10”) percent to twenty-five (“25”) percent” (ALJ Decision at 48, FOF 16-24). “Macroinvertebrate drift rates, a measure of food availability for trout, in the non-peaking Keno reach were five to six times greater than in the peaking reach. Fluctuations in the peaking reach are undoubtedly a contributing factor to the lower macroinvertebrate drift rates” (ALJ Decision at 48, FOF 16-25).

The Klamath Hearings also include record evidence and findings of fact regarding long term impacts of the J.C. Boyle Project on trout. “Average trout size has decrease since Project operations began. For trout residing below J.C. Boyle Dam, the average length has decreased from about twelve inches (30 cm) in 1961, shortly after the J.C. Boyle facility was completed, to about seven inches (18 cm) in 1990” (ALJ Decision at 48, FOF 16-27). “Most rivers in the Pacific Northwest do not naturally experience a ramp rate in excess of two inches per hour, except during or immediately after events such as an intense storm or flood event” (ALJ

Decision at 48, FOF 17-3). “When comparing growth of trout in the non-peaking Keno reach to growth in the J.C. Boyle peaking reach, the following is observed: growth is greater for trout in the peaking reach through age two (“2”), similar growths are recorded between ages two (“2”) and three (“3”), and growth is greater in the Keno reach after age three (“3”)” (ALJ Decision at 48, FOF 16-26). “Trout in the Keno reach are older than those in the peaking reach” (ALJ Decision at 48, FOF 16-30). “Forage fish will provide a higher energy source than invertebrate drift for mature fish and allow for increased growth rates” (ALJ Decision at 49, FOF 16-31). “Project-caused impacts to forage fish in the peaking reach help explain the lower growth rates and absence of larger and older fish in the peaking reach, as compared to the Keno reach” (ALJ Decision at 49, FOF 16-32).

3) The DEIS concludes that redband trout in the J.C. Boyle peaking reach are sufficiently abundant based on a single population estimate conducted over 22 years ago and makes inappropriate comparisons of abundance data between the Klamath River and other large Oregon rivers (FERC DEIS 5-29 lines 26-36). The DEIS cites NPS (U.S. National Park Service - Pacific Northwest Region 1994), which is based on an account in City of Klamath Falls (1986), stating that trout population size in the peaking reach is comparable to the productive Deschutes River. However, this conclusion is flawed because it does not take into account different levels of harvest regulations operating during the sampling periods. In contrast, the FERC analysis in the Salt Caves EIS ((Federal Energy Regulatory Commission 1990), page 3-25) indicates that the trout population in the Deschutes River under *regular harvest* was comparable to the Klamath River Salt Caves reaches (peaking reach) under *restricted harvest regulations*. However, following implementation of restricted harvest regulations on the Deschutes, the Deschutes fish production was no longer comparable to fish production on the Klamath with similar regulations. Comparing production under similar harvest restrictions indicated production on the Klamath was 30-45 percent less than the production on the Deschutes.

The Klamath River redband trout abundance data for the J.C. Boyle peaking reach was collected once over 20 years ago and never repeated to verify for accuracy. Also, the DEIS failed to note that redband trout is the only major salmonid species in the river and then used a comparison with the Deschutes and Metolius Rivers to conclude that redband trout are abundant and therefore are not impacted by Project operations.

The Deschutes River has a fishery comprised of multiple and abundant anadromous and resident salmonid species in multiple year classes including fall Chinook, migratory Spring chinook from tributaries, steelhead, bull trout, brown trout, and mountain whitefish. To compare absolute abundance of a single species of salmonid (redband trout) in one river to the same species that occupies and competes for similar habitat in a complex of multiple salmonid species in another river, is extremely inappropriate. In addition, it should be noted that there are very restrictive angling regulations to protect native redband trout in the Deschutes River, including a 4 month closure and a 2 fish bag limit with a 10-13 inch slot, virtually a de facto catch and release fishery.

The Metolius River is a very cold, oligotrophic river that is not considered highly productive. However, its diverse habitats support multiple salmonid species including redband trout, bull trout, kokanee, mountain whitefish, brook trout, and brown trout. It is inappropriate to compare relative abundances of redband trout in two entirely different aquatic ecosystems with different native salmonid species. The Metolius River has even more restrictive angling regulations than the Deschutes with catch and release angling only.

A better comparison of a large river system with similar hydrology and nutrient load to the Klamath River is the Crooked River. Summer flows for irrigation typically are around 300 cfs. Winter flows were at 10 cfs until 1990 and then increased to 30-75 cfs to increase habitat for trout. Occasional seasonal high flows exceed 3,000 cfs. The river also supports only one other salmonid, native whitefish, that has been estimated to be a minimum of 10 times the abundance of the native redband trout.

Repeated electrofishing surveys on the Crooked River from 1989 to the present have revealed redband trout abundance that ranged from 826 fish/mile to over 8,228 fish/ mile for fish over 8 inches. When winter time flows were restricted to 10 cfs, annual abundance was 826 fish/mile. When winter flows were increased to 30-75 cfs depending on the water year, trout abundance increased dramatically, ranging from 2,889 trout/mile to 8,228 trout/mile (Stuart et al. 1996).

In other words, with flows at only 3 percent of the lowest Klamath River flows, the un-peaked and more stable flows of the Crooked River produces as many trout as the highly peaked and fluctuating Klamath River. With flows at 10 percent of the Klamath River flows, the Crooked River produces as much as 10 times the abundance as the Klamath River. If the Klamath River below J.C. Boyle Dam and Powerhouse were managed with higher minimum flows and less ramping, productivity would increase dramatically.

In conclusion, the Klamath River with a combination of higher minimum flows and reduced ramp rates of 2 inches per hour, would likely dramatically increase trout abundance over the existing or Staff Alternative. In addition, it is possible that the reach below J.C. Boyle Dam would be selected for anadromous fish reintroduction under the Staff Alternative, and it is certain that anadromous fish would be present in this reach under the Staff Alternative with Mandatory Conditions and the Decommissioning Alternative. We agree with the Commission staff's conclusion on page 5-35, lines 41-42, that "a ramping rate of 2 inches per hour is generally accepted as being sufficient to protect rearing salmonids from stranding."

Due to the information described above, which constitutes substantial evidence supporting our ramping rate recommendation, we request that you reconsider your decision on the ramping rate requirement for the J.C. Boyle Powerhouse.

Recommendations 5-2 #30 and #39 (6.4), Copco No. 2 Reach Flows and Ramp Rates

Flows in Copco No. 2 Bypassed Reach

Resident fish and aquatic biota have been impacted heavily in the Copco No. 2 bypassed reach by the removal of almost all of the flows that naturally would have occurred there – only 10 cfs is released in this reach of the Klamath River, naturally flows would be roughly between 300 and 3,000 cfs. The resource agencies agree that minimum flows of at least 500 cfs would benefit fish and other aquatic resources in the Copco No. 2 bypassed reach ((Federal Energy Regulatory Commission 2006a), page 3-248, lines 19-26). Yet, the Staff Alternative is to release only 75 cfs in this reach because “[A]lthough flows in excess of 500 cfs increase the available habitat for trout, other physical constraints such as water quality conditions, especially water temperature, would continue to be a limiting factor for trout productivity in the reach” (DEIS, page 3-248, lines 45-47), and an increase from 10 cfs to 70 cfs would “provide substantially increased

physical habitat for juvenile and adult trout, and a slight increase in habitat for trout fry” (Federal Energy Regulatory Commission 2006b).

We disagree with your assessment because: 1) resident trout are not adversely affected by warm temperatures in the Copco No. 2 bypassed reach; 2) temperatures in the Copco No. 2 bypassed reach would actually decrease with the additional flows recommended by the resource agencies; 3) increased flows in the Copco No. 2 bypassed reach are needed to provide for the significant migratory needs of both resident and anadromous salmonids, as recommended by the resource agencies; and 4) PacifiCorp’s PHABSIM results for the Copco No. 2 bypassed reach are likely underestimating the habitat benefits to juvenile and adult trout from increased flows, and they indicate that fry may be substantially benefited by increased flows, as recommended by the resource agencies. Each of these facts is discussed below.

1) There is no information indicating that higher temperatures may be limiting on site trout productivity in this reach. The reach may exhibit temperatures exceeding 21EC in the summer as suggested in the DEIS, however, redband trout in the Klamath River are adapted to higher temperatures than in other areas (Behnke 1992), and thus will likely be less impacted by the higher temperatures. Behnke (1992) reported the optimal water temperature for growth of these eastern Oregon redband trout is above 19EC. Although temperatures in the Copco No. 2 bypassed reach can be over 21EC, acute mortality of resident trout in the Klamath River does not occur until temperatures reach 28 – 29 EC (Behnke 1992).

2) Bartholow and Heasley (2005) modeled water temperatures downstream of J.C. Boyle Dam under different possible flow scenarios and found that higher flows below J.C. Boyle Dam would actually decrease water temperatures in the river below the dam, not increase water temperatures. They documented that increased flow releases would decrease summer water temperatures by up to 3EC in the reach immediately below J.C. Boyle Dam and above the springs, providing an improvement in the water temperature regime for trout. Given the similar canyon, geomorphology, and flows of the two bypassed reaches, we believe that the same situation is likely to occur in the Copco No. 2 bypassed reach with higher flows reducing temperature, while providing substantially more habitat.

3) The resident trout population has persisted in the Project reaches possibly for millions of years, through a great degree of environmental changes, because it demonstrated a high degree of dispersal among the wide variety of habitats that were available to it prior to construction of the dams on the Klamath River. Resident trout disperse among differing habitats in tributaries and the mainstem Klamath River in order to meet the various habitat needs of their different life history stages in a variable environment. These migratory characteristics are likely to be required to maintain resident trout. The suppression of these migratory characteristics may ultimately lead to the extirpation of redband trout in the Klamath River Basin. These facts are well described in several of the findings of the ALJ:

“The Project contains various habitat areas for resident trout including: a) the J.C. Boyle bypassed reach which extends 4.3 miles from J.C. Boyle Dam to the J.C. Boyle powerhouse; 2) the J.C. Boyle peaking reach extending 17.3 miles and traversing the California/Oregon state line; 3) a 1.4 mile section between Copco II diversion dam and Iron Gate Reservoir; and 4) other reservoirs within the Project reach.” (ALJ Decision at 26, FOF 3-1).

“Migration is one of several defining life history characteristics of trout. Their ability to migrate is one of several evolutionary advantages contributing to survival of trout in the Klamath River for millions of years through dramatic environmental changes.” (ALJ Decision at 27, FOF 3.7).

“The Project restricts migration of resident fish within the main stem and into and out of tributaries. Iron Gate, Copco I, and Copco II Dams do not have fishways and currently block all upstream fish passage. Thus, the stocks above Iron Gate are isolated from counterparts in the lower basin. Further, the stocks between each of Iron Gate, Copco I, and Copco II Dams are similarly isolated.” (ALJ Decision at 27, FOF 3-8).

“Historically, trout in the Copco II area would have moved up and downstream to access needed habitat. To now meet essential life history needs, trout move further downstream over Copco II Dam and utilize either the bypass reach or other tributaries of Iron Gate Reservoir. However, once they exit Copco II they cannot return as there are no upstream passage facilities. Thus, the trout population is not self-sustaining.” (ALJ Decision at 28, FOF 3-14).

The migratory needs of anadromous fish of the Klamath River are well described in the Section 18 conditions for fish passage (U.S. Department of the Interior 2006). Without diversions to the hydroelectric project, the Copco No. 2 bypassed reach would normally receive over 1,000 cfs nearly all year, with winter flows at 3,000 cfs or above (Hardy et al. 2006). The proposed flow of 75 cfs is only 7.5 percent or less than flows that would be normally experienced in this reach. Such an extreme reduction in flow for the two miles of this reach is likely to constrict and possibly limit migration patterns of both resident and anadromous fish once fish passage structures are made functional.

4) Many of the 1-D PHABSIM habitat curves that were provided by PacifiCorp (PacifiCorp 2005a) and were used in the DEIS, show little or no response in habitat amounts with flow changes. We asked two instream flow experts, Dr. Stacy Li, NOAA Fisheries and Dr. George Robison, ODFW, to review PacifiCorp’s PHABSIM model. They concur that PacifiCorp’s 1-D model is flawed and should not be used to make flow recommendations (Li 2006; Robison 2006). Both prefer the modeling capability of the 2-D model that was provided by PacifiCorp in Addley and Allen (Addley and Allen 2005), and urge us to utilize a combination of flow assessment approaches. The 2-D analysis by Addley and Allen (2005) suggests that a flow of 800 cfs would be a good flow recommendation for the peaking reach (Li 2006), which equates to a somewhat higher flow than proposed by BLM in the River Management Condition using a combination of approaches (minimum of 690 cfs at peaking reach).

Our flow recommendation is much closer to the natural historic regime in this reach than 70 cfs proposed in the DEIS, and habitat amounts would be even greater for fish than indicated by the flow study habitat curves when the sidecast materials are removed and higher flows are provided over time. We request that you reconsider our recommendation for flows in the Copco 2 bypassed reach in light of the new information outlined above.

Ramp Rate in Copco No. 2 Bypassed Reach

You state that “it is unclear why such a restrictive ramping rate of 1-inch per hour would be necessary, given there is no evidence of a stranding problem in this bypassed reach and the

infrequent need for ramping” and because the habitat is already marginal (FERC Letter of October 5, 2006).

Under current conditions, we 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. 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. The peaking Copco powerhouses can fluctuate flow by almost 3,000 cfs on a daily basis and disrupt the formation of a consistent downstream current through Iron Gate Reservoir. This hydrologic confusion below the Copco 2 powerhouse will interfere with vital migratory cues for out-migrating smolts, causing delays and exacerbating predation in addition to causing stranding and entrapment as described in U.S. Department of the Interior (2006) pages D-13 and D-14. We disagree with the FERC staff conclusion that run-of-river operations at Copco will have no benefit for aquatic resources, and combined with a protective ramping rate, would lead to a restored fishery in the Copco No. 2 bypassed reach.

Recommendations 5-2 #31 and #39 (6.5) Fall Creek Bypassed Reach Flows and Ramp Rate

Flows in Fall Creek

You conclude that releasing a percentage of inflow into the Fall Creek bypassed reach while adhering to a protective ramp rate, as we recommend, would be too costly (violating the equal consideration provision of Section 4(e) of the FPA). You conclude that the benefits of increased aquatic habitat do not justify the costs of lost Project income and lower power generation.

We disagree with your conclusion that a substantial improvement of instream flow in the Fall Creek bypass reach is not warranted. You based your conclusion on the catch per unit effort data provided by a limited fisheries survey by PacifiCorp, where catch of trout per 100 feet of stream was similar at 3.1 and 3.6 fish, respectively, for Fall Creek above and below the diversion (DEIS p. 5-31). While the DEIS recognizes that higher flows would provide more physical habitat for trout (DEIS p. 3-252-253), it also concludes that the higher flows recommended by resource agencies (40 percent of inflow, generally ranging from 14 to 22 cfs under typical flow conditions) would provide only a limited benefit compared to PacifiCorp’s proposal of 5 cfs minimum flow.

In making this determination, only the July 2005 PacifiCorp fish sampling effort appears to have been considered by the Commission. This study indicated the density of rainbow trout upstream of the Fall Creek diversion dam was similar to the densities downstream. The fish were only sampled in reaches affected by the Project, i.e., immediately above the dams and below the dams. Sample sites above the dams were in the immediate vicinity of the canal diversions where fish density is reduced by depletion caused by entrainment into the canals. Fish density below the dams is reduced by low stream flows, lack of suitable habitat, and ramping. Fish density was not determined in areas outside of the project influence. Because of this flawed analysis, the overall interpretation is that the trout population appears to be healthy, when in fact, the total trout abundance is very low. Contributing factors to low trout abundance include lack of upstream fish passage and entrainment into the power canals.

Beyond having sampling bias, the PacifiCorp fisheries assessment had limited sampling overall. The study yielded a small sample size (15 trout below the diversion and 9 above) and no diversity of fish species (no non-trout fish species were sampled or evaluated). Based on the study write-up, approximately 7 minutes were spent sampling above the diversion dam on Fall Creek and 5 minutes spent sampling below. This is a small scale fish survey, limited to the immediate area of the diversion dam.

In contrast to the data considered in the DEIS, the following information supports our conclusion that substantially higher flows than the 5 cfs are needed in the Fall Creek bypassed reach:

- 1) Physical habitat availability for rainbow trout is higher at higher flows, and
- 2) Fall Creek provides important spawning and rearing habitat for resident fish and will provide important spawning and rearing habitat for reintroduced anadromous fish.

Fall Creek is a much dewatered reach and receives less than one percent of the mean annual flow. It is one of the more strongly impacted of all stream reaches impacted by the Project. The existing minimum flow is 0.5 cfs, which means that less than 0.5 percent of the mean annual flow is available for aquatic and riparian resources. FERC's proposal to increase minimum flow to 5 cfs is an improvement, but still gives the majority of the flow (50 cfs) for diversion to the power canal. Since the majority of water available is diverted for power generation, only a small fraction of the inflow is available for aquatic and riparian resources.

The habitat curves provided in the instream flow study conducted by PacifiCorp (PacifiCorp 2005a) are generally relatively flat, probably because the channel has been altered by reduced flows for over 100 years. However, as FERC points out (DEIS, page 3-253), the WUA curves indicate that greater amounts of habitat would exist for all life stages of rainbow trout at higher flows.

The flows we propose are much closer to the natural historic regime in this reach, and habitat would be even greater for fish than indicated by the flow study habitat curves. Obviously, flow releases greater than the FERC recommended 5 cfs would provide substantially greater amounts of physical habitat for fish, and the flows recommended by CDFG, ODFW, NMFS, and ourselves provide more optimal habitat for trout.

Rulings from the recent Klamath Hearings highlight the impact of the Project and the potential for anadromous fish use if flows are restored. "There are at least 12 miles of perennial stream reaches within the Project area that have gradients at or below 15 percent. These include: "Jenny, Fall, Shovel, and Spencer Creeks, which presently support spawning by resident salmonids thereby suggesting that those habitat would be suitable for use by anadromous fish" (ALJ Decision at 34, FOF 6-11). "Fall and Shovel Creeks have the water temperatures most suited for juvenile Coho [ESA-listed] salmon rearing" (ALJ Decision at 34, FOF 6-13). We highlight these ALJ findings because they support our recommended higher flow in Fall Creek, improving Fall Creek flows would improve conditions for reintroduced anadromous fish in addition to resident redband trout.

We request that you reconsider our recommendation for flows on Fall Creek in light of the new information provided above.

Ramp rate on Fall Creek

We agree with your position on ramp rates for the Fall Creek Diversion Dam.

Recommendations 5-2 #32 and #39 (6.5) Spring Creek Diversion Dam Flows and Ramp Rate

We appreciate your agreement with the proposal to release all inflow to the Spring Creek Diversion Dam downstream of the dam from June 1 to September 15. However, we disagree with your conclusion that the benefits of increased aquatic habitat, that would be provided by our recommended flows of 50 percent of inflow to Spring Creek Diversion Dam from September 15 to May 30, do not justify the costs of lost Project income and lower power generation. We understand that you are particularly concerned with the costs involved in providing a release system capable of responding to changing inflows at the remote Spring Creek diversion dam site. We believe that a substantial improvement of instream flow in the bypass reach is possible with flows greater than the 1 cfs that you propose. We disagree with your argument that the limited amount of habitat and small size of trout in Spring Creek upstream of the diversion limits the benefit to the fishery from the higher flows proposed by the agencies.

Spring Creek is an important tributary to Jenny Creek, which supports native populations of rainbow trout and Jenny Creek suckers (*Catostomus rimiculus*). Diverted water from Spring Creek reduces the amount of water available for trout habitat and substantially increases thermal heating of the water. Just as importantly, surface flows in Spring Creek also dry up for approximately one third the length of the stream, when PacifiCorp diverts water and releases the current 0.22 cfs.

Your modest increase in flow to 1 cfs will barely support fish life in the stream. One cfs is an arbitrary designation without any corresponding analysis to justify it as an alternative. One cfs would not provide adequate habitat for fish looking for cover and interstitial places to hide and conserve energy during the winter months. It would not provide such refugia from high flows on Jenny Creek. 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. This low flow, spread out over a wide channel may have the potential for winter freezing, further decreasing habitat quality. Conversely, 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 corresponding cold and warm water refugia. This flow regime would also cause a very dramatic difference between summer (up to 16.5 cfs) and winter flows (1 cfs) in a stream system where aquatic organisms are not adapted to large fluctuations. Low flows in the winter and high flows in the summer are exactly opposite of what has occurred in this basin historically, and again, what the aquatic organisms in this system are adapted to.

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, we propose that PacifiCorp release 4 cfs from September 16 through May 31. By increasing the winter flows to 4 cfs, there is great potential for fish to use this stream as winter refugia and for aquatic mollusks to maintain their presence below the PacifiCorp diversion. This would provide much of the benefit contained within our original 10(j) recommendation of 50 percent of inflow, while substantially reducing the cost to PacifiCorp.

Spring Creek Ramp Rate

We agree with your position on ramp rates for the Spring Creek Diversion Dam.

Recommendation 5-2 #35 (6.7) Iron Gate Dam Flows

It is not clear in the DEIS or your letter how the Commission intends to regulate operations at Iron Gate in any new Project license, and we look forward to clarifying this issue at the 10(j) meeting in Redding, California.

We concur with your opinion that flows released from Iron Gate Dam should be consistent with Reclamation's Klamath Project Operations Plan and the biological opinions to be issued by FWS and NMFS. Stranding of anadromous salmonids and other fish as a result of Iron Gate Dam operations have been documented (USDI Fish and Wildlife Service 1998 and Shaw pers. comm.).

We agree with your statement that "The limited storage that is available in PacifiCorp's reservoirs would be most valuable for use during short-term emergencies when immediate flow increases are needed to avert impending fish losses based on observed increases in fish losses or adverse water quality conditions" (DEIS p. 5-34, lines 41-43). However, we disagree with your estimate of the current storage capacity of the Project reservoirs (DEIS, page 5-34, lines 12-17). As we stated in U.S. Department of the Interior (2006), page D-40, "Our estimate of active storage for these reservoirs is different from the amount reported in the Applicant's documents, which report only the active storage that is available during normal operations. The USGS has estimated actual active storage in Copco and Iron Gate Reservoirs at approximately 52,000 ac/ft. (Campbell and Heasley, pers. comm.). They used a procedure outlined in the September 27, 2005, memo attachment to the U.S. Fish and Wildlife Service November 17, 2005, letter commenting on PacifiCorp's response to information request AR-1a, dated September 2005. A volume of 52,000 AF would provide approximately 875.4 cfs per day for a 30 day month (Campbell, pers. comm.)." We recommend that you correct your estimate of active storage for the Project and specifically require that this storage be available to address short-term emergencies.

Recommendation 5-3 #16 (6.3) Geomorphic and Juvenile Outmigrant Flows at J.C. Boyle

We disagree with your contentions that: 1) "spillage from J.C. Boyle dam in many years is sufficient to flush fine-grained sediment from any spawning gravel that may be present in the bypassed reaches", and 2) "J.C. Boyle bypassed reach currently supports a high density of trout, comparable to those in the lower Deschutes River, considered one of the most productive rivers in Oregon". These issues are discussed below.

1) The flushing of fine sediments in spawning beds was only one of several benefits anticipated to result periodic release of more than 3,300 cfs. Two other reasons supporting the need for seasonal high-flows are to increase stream channel complexity and to provide riparian maintenance flows. The rationale and benefits for these flows are clearly stated justification and rationale provided to the Commission (US Department of the Interior 2006 pp. A-28-29).

Project diversions remove approximately 3,000 cfs from peak flow events. This results in significantly fewer events capable of performing ecologically important channel maintenance functions. In the bypass reach, PacifiCorp provides flows limited to 100 cfs 89 percent of the time (US Department of the Interior 2006, A-24). When flows greater than 100 cfs do occur in the bypass reach, they are abrupt, are short in duration, and do not reflect a flow regime with seasonal variability.

Statistics showing the magnitude of hydrologic change due to project operations were provided to FERC in the March 27, 2006 response to the Final License Application citing Huntington (2006), which demonstrates that the Project reduces the magnitude and variability of monthly flows by 75%. Clearly, changes in flood flow regimes of this magnitude will have ecological consequences beyond merely an increased ability to flush out fine sediments from spawning areas.

The August 2006 Klamath Hearings resulted in several critical findings regarding effects of the existing flow regime and the benefits of seasonal high flows in mitigating for multiple resource impacts. Effects of the current flow regime included encroachment of reed canary-grass, smaller alluvial features, reduced capacity to mobilize river bedload by 83% to 96%, and a reduction of mean annual flow from approximately 1,560 cfs to 296 cfs. Benefits of the seasonal high flow prescription include a more dynamic channel with a wider range of sediment deposition, an increase in the frequency and magnitude of flow events capable of scouring reed canary-grass from alluvial features, and a significant increase in flows capable of mobilizing the channel bed.

The importance of the seasonal high flow when viewed as a key component of the suite of flow and gravel management recommendations was highlighted in the ALJ's final decision regarding importance of these flows to fish habitat: *"Implementation of coordinated sediment delivery with seasonal high flows can result in deposition of gravel in velocity pockets on the bed and fine sands on the banks. These deposits have ecological benefits including creating spawning pockets around boulders and in pools"* (ALJ Decision at 42, FOF 14-4).

In addition to effects on riparian and fish habitat, the seasonal high flow was also determined to have important ecological benefits on trout rearing and migration. Based on radio telemetry and tagging studies provided by PacifiCorp and ODFW, it was determined that both downstream and upstream migration events were associated with increased flow (ALJ Decision at 43, FOF 14-17 through 14-19).

Although it is unclear from these conclusions, it is assumed that FERC has interpreted "sufficient spill duration and quantity" based on PacifiCorp's mobilization threshold estimates and the fact that spill equal to or above the proposed threshold flow occur relatively frequently. The numbers generated for the threshold of mobility relied heavily on PacifiCorp's gravel tracer study. Numerous biases built into their studies caused bed mobilization thresholds to be inconclusive.

Among the problems noted, the sites selected for the gravel tracer study were not representative of the channel. The tracer particles used in the study in the bypass reach were placed in the steepest section of the river and were limited to the center of the channel. The flow numbers generated to describe the threshold of mobility relied on biased pebble count data to characterize the grain size distribution of the existing bed and bars. Again, the pebble count sites selected were those with smaller sized material, and were not representative of the entire cross section.

These factors would all tend to result in a significant underestimation of bed mobility threshold flows. These findings are in addition to precautions from the study authors who noted that because a significant fraction of the total shear stress is not actually available to mobilize the bed, the estimates of flow at incipient motion likely underestimates the flow required to mobilize the bed for both with-Project and without-Project conditions (PacifiCorp 2004, Water Resources Final Technical Report, page 6-19).

The Staff conclusion relies on two assumptions: a) that 1,700 cfs actually adequately mobilizes the armoring layer, allowing subsurface fines below to move also; and b) that the frequency and duration of this flow is adequate to flush spawning gravels.

There are several reasons why the threshold of mobility modeling results should be considered as having a wide range of error around them. The analysis should reflect the uncertainty associated with the 1,700 cfs flow at which the bed is mobilized. In fact, the evidence suggests that 1,700 cfs underestimates the threshold of mobility in this system.

Table 3-6 (DEIS page 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. The duration of flows above 1,700 cfs occurs between 28 and 100 percent of the time without-project and between just 2 and 16 percent of the time with the project. Thus, 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.

FERC relies on Table 3-18 (DEIS page 3-73) for its analysis of adequacy of spill magnitude. This analysis, which provides average spill rates summarized by month, provides little insight to the actual frequency and magnitude of high flow events. There is no peak flow analysis and the return interval for which bed mobilizing flows are provided is not apparent in the DEIS.

In summary, our interpretation of the data indicates that frequent (two or fewer year return frequency) flows over 3000 cfs are needed to maintain physical and biotic integrity of the JC Boyle Bypass reach. The data does not support the notion that existing spillage is adequate to support channel processes.

2) The argument that flushing flows are adequate because the trout population in the J.C. Boyle reaches is comparable to one of the most productive populations in the state of Oregon is flawed. FERC improperly uses catch rates and fish densities as the only rationale for adequacy of existing and proposed flow regimes for the bypassed reaches. FERC overlooks other relevant information about the population which demonstrates impacts due to Project operations, including low Project flows and low food availability. Creel census data (Toman 1983) illustrates that numbers of trout in the J.C. Boyle Bypassed and J.C. Boyle Peaking Reaches were less than in the Keno Reach, and the size of fish was significantly larger in the Keno Reach. This pattern was also revealed in (PacifiCorp 2005b) Section 3.9.3, (Addley et al. 2005) which showed that trout are significantly larger and have higher growth rates in the Keno Reach than in the J.C. Boyle Peaking or Bypassed River Reaches. Oregon Department of Fish and Wildlife research from 1988-1991 (Buchanan et al. 1991; Buchanan et al. 1994; Hemmingsen et al. 1992) and the Final Environmental Impact Statement (EIS) for the proposed Salt Caves Project (Federal Energy Regulatory Commission 1990) also noted low adult trout densities in the upper end of the peaking reach. Finally, ODFW (Oregon Department of Fish and Wildlife 2006)

validates previous studies which show that there are few large fish in the peaking reach and they have poor condition in late summer relative to trout in the Keno reach.

The August, 2006 Klamath Hearings resulted in several critical findings regarding the importance of seasonal high flows in mitigating for ongoing impacts to fisheries habitat, including spawning habitat quality and quantity:

Implementation of coordinated sediment delivery with seasonal high flows can result in deposition of gravel in velocity pockets on the bed and fine sands on the banks. These deposits have ecological benefits including creating spawning pockets around boulders and in pools (ALJ Decision at 42, FOF 14-4). Trout spawning gravel in the bypass reach is embedded with fine silt. In July 2006, the spawning gravel in the bypass reach below the emergency spillway was fifty (“50”) percent embedded with silt and sand (ALJ Decision at 42, FOF 14-7). An annual flushing flow can clean and redeposit gravel to provide quality spawning habitat. To be effective, flushing flows need adequate duration and frequency to mobilize and redistribute fine sediments in the spawning beds (ALJ Decision at 42, FOF 14-8). In the bypass reach, PacifiCorp provides flows limited to 100 cfs eight-nine (“89”) percent of the time. When flows greater than 100 cfs do occur in the bypass reach, they are abrupt, are short in duration, and do not reflect a flow regime with seasonal variability (ALJ Decision at 43, FOF 14-16). The timing of the BLM seasonal high flow condition reflects the natural hydrologic flood regime under which redband trout evolved. The BLM seasonal high flow condition will be implemented during the normal peak flow period. (ALJ Decision at 43, FOF 14-17). If the gravel at the emergency spillway were transported downstream by seasonal high flows, they would be more valuable fish habitat because the gravel would be transported to more stable locations and better sorted into spawning sizes. (ALJ Decision at 44, FOF 14-25).

The ALJ findings above, and information summarized in our preliminary recommendations (US Department of the Interior 2006), strongly indicate that Geomorphic and Juvenile Outmigrant Flows should be provided in the J.C. Boyle bypassed reach.

Recommendation 5-2 #36 (7) Geomorphic and Juvenile Outmigrant Flows at Copco No. 2

FERC’s conclusion that Copco No. 2 bypass reach would not support a quality trout fishery is not substantiated by the facts presented in the recommendations (US Department of the Interior 2006), the August 2006 Klamath Hearings, and the ALJ’s Decisions. The fast growing and relatively large fish of the Keno reach of Klamath River, where water temperatures are equal to or even higher than at Copco Dam releases (See water quality model outputs, PacifiCorp 2005), is clear evidence that trout can survive in warm water reaches of the Klamath River. Regardless, the flushing flow prescription recommended by the Service was intended to provide a variety of ecological benefits, only one of which was the restoration of spawning habitat for redband trout. Similar to the analysis for the J.C. Boyle Bypass reach, FERC appears to disregard the other purposes and benefits that would occur by restoring a flood flow regime capable of mobilizing the channel bed.

FERC refers to the same flawed bedload threshold flow analysis and relied on limited spill data provided by PacifiCorp to conclude that spill is adequate to provide bed mobilizing flows. This analysis is inadequate for the same reasons cited above for the J.C. Boyle Bypassed Reach.

The ALJ concluded that, “Warm water temperatures in the summer and cold water temperatures in the winter will not preclude anadromous fish from successfully utilizing habitat above Iron Gate Dam” (ALJ Decision at 14, FOF 2A-14). Chinook salmon are less tolerant of warm water conditions than are resident trout (EPA 2003). The fact that the Copco 2 bypassed reach historically supported spawning Chinook salmon (DEIS, page 5-19, line 43) indicates that the reach would support resident trout, given adequate flow and habitat conditions.

Project manipulation of the hydrograph at the Copco No. 2 Dam contributes to a suite of adverse conditions in the bypassed reach. Reduction of seasonal high flow frequency and magnitude helps create a confined channel choked with car-size boulders and decades-old woody vegetation. The severe vegetation encroachment and channel confinement seen in the Copco 2 reach result from Project manipulation of the hydrograph. Along with minimal base flows, exacerbation of water quality impairment and blocked fish access to temperature refugia; the Project reduces the frequency and magnitude of seasonally high flows necessary for the maintenance of a healthy channel. As with the J.C. Boyle bypassed reach, seasonally high flows should be provided in the Copco 2 bypassed reach.

For the same reasons as with the J.C. Boyle bypassed reach, above, seasonally high flows should be provided in the Copco 2 bypassed reach to restore the channel to a more natural condition, thereby enhancing the fishery for both resident trout and reintroduced anadromous fish.

Recommendation 5-3 #20 (6.3) Hydrologic Monitoring – Gages

We agree with most of the analysis in your letter dated October 5, 2006, concerning hydrologic gaging. However, we disagree that the flow regime for the J.C. Boyle development should be set at a constant 200 cfs because provision of a natural pattern of hydrologic variation is necessary to restore and maintain a healthy aquatic ecosystem as described in U.S. Department of the Interior (2006) pages D-12 and A-40-41. Given that our position is that the proportional inflow to J.C. Boyle Reservoir should be the basis for determining outflow to the J.C. Boyle bypassed reach, as described in the River Corridor Management Condition, we continue to recommend an updated gage be funded at Spencer Creek inflow to J.C. Boyle Reservoir.

Recommendation 5-2 #59 (1) and (2), #68 (3), #60 (4), Fish Habitat Protection, Mitigation, and Enhancement Plans

In response to your October 5, 2006 letter, page 6-7, we appreciate and agree with FERC’s efforts to develop mitigation measures that address identified project-specific effects. However, we also believe that the mitigation measures proposed in the Staff Alternative do not adequately offset all of the Project Impacts identified in the DEIS. Examples of impacts that will not be fully offset by the mitigation measures proposed include: 1) even with fish passage structures and fish screens, it is likely that a number of resident trout and anadromous fish will be impacted and potentially lost in their attempts to migrate past the dams; 2) without removal of the dams, measures to reduce the impacts of the dams on water quality (i.e., water temperature, nutrient, and toxic algae levels) will not remove all of these impacts; 3) by continuing to allow hydroelectric peaking, some of the impacts of peaking on the aquatic community will persist; and 4) your recommended anadromous fish restoration program will only reintroduce anadromous fish to one designated Project reach, so the continuing impacts of anadromous fish

being extirpated from the non-designated portions of their former range will not be mitigated for quite some time, if at all.

Given that a significant cumulative amount of impacts of the Project will continue for the relicensed life of the Project, it is appropriate to require that a Protection, Mitigation, and Enhancement Plan be implemented that will review Project Impacts over time and continue to develop and implement mitigation measures to offset these effects on the aquatic community and fisheries. We proposed such plans for this purpose in the first 4 10(j) recommendations in Interior's Attachment D.

In your letter of October 5, 2006, you state that the "recommended measures lack the specificity necessary for our comprehensive development analysis..." We intentionally left out specificity in these plans, suggesting instead that they be developed in consultation with the Service and resource agencies and submitted for FERC approval. This is one of the functions of our recommended Fisheries Technical Subcommittee.

Recommendation 5-3 #22 (6.3) Gravel Management Plan

We disagree with your assessment that the fishery benefits of supplementing a greater amount of gravel into the J.C. Boyle bypassed and peaking reaches, as we recommend, would not justify the additional cost, as stated in your letter of October 5, 2006. Your reasoning is that the Boyle peaking reach already supports one of the best trout fisheries in the region based on the trout population size and angler catch rates, and operational and habitat enhancement measures proposed by PacifiCorp would substantially enhance the fishery, as would the expanded gravel augmentation measure in the Staff Alternative. We disagree because: 1) the fishery in the Boyle reaches is not one of the best trout fisheries in the region due to impacts of the PacifiCorp Project, 2) the fish habitat in the Boyle reaches could be substantially improved with operational changes including greater gravel augmentation, 3) information contained in the DEIS and FLA do not describe how 100 to 200 cubic yards was determined as the amount of gravel to supplement, in fact, the FLA contains contradictory information in this regard, and 4) there is no description of how 10 annual placements of the 100 to 200 cubic yards was determined. These facts are discussed in more detail, below.

1) See our discussion of this issue at point number 3 under Recommendation 5-3 #19 (6.3) Ramp Rates at J.C. Boyle Powerhouse

2) Information contained in the preliminary conditions, prescriptions, and recommendations (US Department of the Interior 2006) demonstrate that a well-coordinated and implemented plan that incorporates appropriate levels of both gravel augmentation and seasonal high flows is needed to mitigate the impacts of the Project on spawning gravels in the Project reaches. Through the Klamath Hearings, the ALJ supported this determination. The following findings of fact affirm the need and benefits of gravel augmentation.

"Seasonal high flows, in combination with the BLM'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 an ecological benefit" (ALJ Decision at 38, FOF 10-5).

“Current Project operations, particularly sediment blockage at the J.C. Boyle Dam, the flow regime, and peaking operations, negatively affect the redband trout fishery. The proposed River Corridor Management Conditions would improve fishery resources” (ALJ Decision at 88, UFOF 14).

“In the J.C. Boyle bypass reach, the channel bed is dominated by sixty-four (“64”) percent boulders and twenty-eight (“28”) percent cobble. A reduction in fine grain deposits diminishes the quantity and quality of fish habitat” (ALJ Decision at 41, FOF 14-1).

“Sediment trapping by J.C. Boyle Dam is the primary cause of low sediment availability in the bypass reach” (ALJ Decision at 42, FOF 14-2).

“Implementation of coordinated sediment delivery with seasonal high flows can result in deposition of gravel in velocity pockets on the bed and fine sands on the banks. These deposits have ecological benefits including crating spawning pockets around boulders and in pools” (ALJ Decision at 42, FOF 14-4).

3) Neither the DEIS or the FLA clearly describe why 100 to 200 cubic yards of gravel is proposed by the Staff or PacifiCorp, how these quantities were determined, or the relevance to physical setting and processes. The Staff used the quantity of gravel PacifiCorp proposed to approximate the cost of gravel augmentation, but did not explain why these numbers were used for the estimate. Since the Staff Alternative is to develop a gravel augmentation plan based on mapping and monitoring, the analysis is inadequate because the costs are based on a quantity of gravel that is not justified. The FLA also contains contradictory information: 100 to 200 cubic yards in the J.C. Boyle bypassed reach is proposed (FLA Exhibit E page 4-170), yet 10 to 20 percent of the total sediment yield is also proposed. The FLA states,

“The volume of the initial augmentation in selected reaches is calculated as 10 to 20 percent of the average annual volume of tributary and hillslope inputs trapped in the upstream Project reservoir(s). The range of 10 to 20 percent adjusts the results of the sediment budget to reflect the fact that only a fraction (probably less than 10 percent) of the total tributary sediment yield in each reach is composed of spawnable material” (FLA p.4-169.0).

In the FLA, PacifiCorp proposed gravel augmentation of 10 to 20 percent of the average annual volume of sediment input trapped in upstream Project reservoir(s) to adjust for the amount that would comprise spawnable material. However, the River Gravel Management Plan is proposed for reasons other than to increase availability of spawning habitat.

The FERC Staff concluded that mapping of gravel before and after placement would be useful to help quantify the benefits and guide future augmentation efforts. This type of mapping exercise for pre-gravel placement was completed by Cluer for the Klamath Hearings (Cluer, Ex. 0, 10:20 to 13:4). Based on an assessment of the bed material in the J.C. Boyle bypass reach, an estimate of the percentage of the bed that could trap coarse sediment was determined (Cluer, Ex. 0, 12:25,13:1-2). This coarse sediment would include a range of sizes to benefit spawning, rearing, and riparian habitat. Consistent with the Staff Conclusion, subsequent augmentation volumes would be determined following results of monitoring.

Further, the Staff Alternative does not discuss supplying a range of sediment sizes. This range would be provided to increase spawning habitat, increase channel complexity (rearing habitat), and improve quality of riparian habitat. The analysis of the importance of supplying various sizes of sediment is in Cluer's written testimony for the Klamath Hearings (Cluer, Ex. 0) and the BLM River Corridor Management Condition (US Department of the Interior 2006). The findings of fact from the ALJ support these analyses. The ALJ determined that the BLM proposed gravel augmentation program, combined with the seasonal high flow, will likely create a more dynamic channel with a wider range of sediment deposits. This sediment will be deposited higher on the channel margin, providing an ecological benefit (ALJ Decision at 38, FOF 10-5). In addition, the ALJ stated that implementation of coordinated sediment delivery with seasonal high flows can result in deposition of gravel in velocity pockets on the bed and fine sands on the banks. These deposits have ecological benefits including creating spawning pockets around boulders and in pools (ALJ Decision at 42, FOF 14-4).

4) The measures proposed specify no minimum or maximum amounts of sediment associated with their implementation, thus the assumption that 10 annual placements would be sufficient is arbitrary. Staff states that these measures include "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." Since it is uncertain what "plan" is being referenced, it is unclear as to whether the intent is to provide sediment for a specific number of redds or for an area of the stream channel. A more realistic approach would be to calculate the amount of channel capable of retaining sediment, and as stated by staff "surfaces suitable for riparian recruitment," and to base cost estimates on these quantities. An estimate of the area of the bypass reach capable of retaining sediment was made by Cluer in his testimony for the Klamath Hearings (Cluer, Ex. 0). He calculated that 36% of the reach would retain sediment, and that the quantity needed to "fill" those areas would be approximately 26,600 cubic yards (Cluer, Ex. 0, pp. 11:3 to 13:2). This type of estimate would provide a more realistic range of costs associated with implementing augmentation to meet as-yet unspecified goals.

Information contained in the preliminary conditions, prescriptions, and recommendations (US Department of the Interior 2006) and Klamath hearings demonstrate that a well-coordinated and implemented plan that incorporates appropriate levels of both sediment augmentation and seasonal high flows is needed. The information above indicates that the gravel management plan needs to include an initial large gravel placement to compensate for the sediment that has been blocked by the Project dam and reservoir (Cluer Ex. 0). Subsequent sediment augmentation would then be determined by monitoring results. This type of gravel management plan would mitigate for project effects on spawning habitat, stream channel complexity (rearing habitat), and riparian habitat in the Project reaches.

Recommendation 5-2 # 60 (4) Pacific Lamprey Management Plan

Your letter dated October 5, 2006 and the DEIS (page 3-312, lines 34-40), indicate that you do not support the development of fish passage for adult lamprey because you consider it unlikely that young would be able to outmigrate or that adults would be effectively attracted to fish ladders associated with Iron Gate hatchery. No supporting information is provided to support these claims. In contrast, testimony and exhibits were provided by expert witnesses to the Klamath Hearings process and several findings are contrary to your claims. These findings are:

“Although the evidence is inconclusive as to whether Pacific lamprey were historically present above Iron Gate Dam, the record evidence shows that access to habitat would benefit that species of fish by providing it with additional spawning and rearing grounds” (ALJ Decision at 86, UFOF 10).

“Pacific lamprey below Iron Gate Dam would migrate above the dam if access was provided through fishways” (ALJ Decision at 37, FOF 8-7).

“Volitional passage for Pacific lamprey has been designed and is in place in other river systems” (ALJ Decision at 37, FOF 8-8).

“Access to habitat would benefit Pacific lamprey by increasing their viability through: a) extending the range and distribution of the species; b) providing additional spawning and rearing habitat; c) increasing the genetic diversity of the species; and d) increasing the abundance of the Pacific lamprey population” (ALJ Decision at 38, FOF 8-9).

Given this new information, we request that you reconsider and require a Lamprey Management Plan in the license, as we recommended.

Recommendation 5-2 #71 (12B2) Monitoring - Anadromous Fish, Resident Fish, and License Condition Effectiveness

We agree that the scope of monitoring required in the license should be limited to those aspects that are influenced by the Project, however, we disagree with some aspects of the Project’s influence that you discuss on page 5-45. In lines 14 through 19 (DEIS page 5-45), you state that monitoring riverine fish populations and fish migration and movement is not justified because all available information indicates that the trout fisheries in the Keno and J.C. Boyle reaches are in good condition. In fact, the trout fisheries in the Project reaches are not in good condition and they are adversely affected by Project impacts including the lack of fish passage. Several ALJ findings from the Klamath Hearings confirm this position. See our discussion of point #3 under the section on Recommendation 5-3 #19 (6.3) Ramp Rates at J.C. Boyle Powerhouse, above, and a listing, below, of the ALJ’s supportive findings:

1. “Project operations have and continue to adversely affect the resident trout fishery by, among other things: a) confining the resident trout between the Project dams and associated reservoir thereby impairing their utilization of the full range of life history strategies and spawning productivity; b) unscreened flow through Project turbines result in mortality of juvenile and adult trout migrating down stream; and the inability to effectively migrate adversely affects the genetic health and long term survival of the resident species.” (ALJ Decision at 86, UFOF 6)
2. “Entrainment at Project facilities have and continue to adversely affect the resident fishery resources.” (ALJ Decision at 86, UFOF 7)
3. “Current Project operations, particularly sediment blockage at the J.C. Boyle Dam, the flow regime, and peaking operations, negatively affect the redband trout fishery. The proposed River Corridor Management Conditions would improve fishery resources.” (ALJ 87, UFOF 14)

4. “The BLM’s proposed upramp rate will improve conditions for fish resources and other aquatic organisms by reducing adverse effects caused by the existing nine inch/hour upramp rate.” (ALJ Decision at 87, UFOF 15)

5. Also see most of the Findings of Fact concerning USFWS/NMFS Issues 3 and 4 (ALJ Decision at 26-32) and BLM Issues 16 and 17 (ALJ Decision at 44 – 50).

We also disagree with your 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 (DEIS, 5-45, lines 40-43). In fact, resident trout survival and reproduction are 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. Again, several ALJ findings from the Klamath Hearings confirm this position, and these are listed below:

1. “Prior to the construction of the dams, redband trout within the Project area belonged to a single, large, intermixing population throughout the Klamath River Basin.” (ALJ Decision at 26, FOF 3-4)

2. “Although the trout sport fishery is robust in the Upper Klamath Basin, the juvenile trout from above J.C. Boyle Dam in the Oregon portion of the Klamath River are actually decreasing.” (ALJ Decision at 26, FOF 3-5)

3. “Life history strategies (such as spawning above the J.C. Boyle Dam) are denied to the resident trout population below the dam.” (ALJ Decision at 26, FOF 3-6)

4. “Migration is one of several defining life history characteristic of trout. Their ability to migrate is one of several evolutionary advantages contributing to survival of trout in the Klamath River for millions of years through dramatic environmental changes.” (ALJ Decision at 27, FOF 3-7)

5. “The Project restricts migration of resident fish within the main stem and into and out of tributaries. Iron Gate, Copco I, and Copco II Dams do not have fishways and currently block all upstream fish passage. Thus, the stocks above Iron Gate are isolated from counterparts in the lower basin. Further, the stocks between each of Iron Gate, Copco I, and Copco II Dams are similarly isolated.” (ALJ Decision at 27, FOF 3-8)

6. “Spencer Creek is a highly productive spawning and rearing habitat for rainbow/redband trout. The stock of rainbow/redband trout in the bypass and peaking reaches below J.C. Boyle Dam is denied the use of Spencer Creek and other suitable habitat upstream of the J.C. Boyle Dam.” (ALJ Decision at 27, FOF 3-13)

7. “Downstream migration of rainbow/redband trout is also adversely impacted because of the Project dams. This is due to the hydraulics at the Project dams and mortality related to unscreened flow resulting in fish passage through Project dam turbines.” (ALJ Decision at 28, FOF 3-15)

8. “The Project’s limitation on riverine migration may have reduced the genetic diversity of the remaining stocks within the Project reaches.” (ALJ Decision at 28, FOF 3-16)

The DEIS does not completely describe the scope of the fisheries monitoring that will 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 (DEIS, page 5-7). Given the new information, above, and the lack of specificity of the monitoring requirements, we recommend that you require that the monitoring plans be developed in consultation with 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.

Recommendation 5-2 #95 (16) Keno Sucker Fish Ladder Adaptive Management Plan

We agree with your statement in the DEIS (page 5-39, lines 19-33) that adult suckers that take up residence in project reservoirs could contribute to species conservation as a reserve population that could rebuild upstream populations if they were to decline substantially in the future. We also agree that the sucker populations in the downstream reservoirs do not normally contribute to the sucker populations upstream because they do not have sufficient reproductive capacity. However, we do believe that the potential need for upstream passage for suckers at Keno Dam needs to be monitored. Therefore, we continue to recommend that you include the Keno Fish Ladder Adaptive Management Plan for upstream passage of endangered suckers.

Shortnose suckers are fairly common in J.C. Boyle Reservoir while Lost River suckers are rare (Desjardins and Markle 2000). We suspect that substantial numbers of suckers drift into J.C. Boyle Reservoir from Upper Klamath Lake based on entrainment studies at Link River Dam and fish sampling in Keno Reservoir (Gutermuth et al. 2000; Terwilliger et al. 2004). Monitoring of fish passage at Keno Dam has demonstrated small numbers of fish moving upstream through the existing ladder at Keno Dam (PacifiCorp 1997). Given that these species are listed as endangered under the Endangered Species Act, it is prudent to monitor potential impacts to these species associated with fish passage attempts.

Comments on Recommendations that were not included in Oct 5 letter

Following are comments to recommendations that were not discussed in your letter on Section 10(j) Preliminary Determination of Inconsistency, dated October 5, 2006.

Recommendation 5-2 #19 (9) Water Temperature Remediation

We agree with your proposed measure to improve water temperatures exiting Iron Gate Dam through measure 2P (page 5-1, lines 29-39); however, we recommend that this measure also be required for Copco No. 1 Dam because temperature benefits downstream of Copco No. 2 Dam would improve the resident trout fishery and fish passage of anadromous fisheries through the Copco No. 2 bypassed reach. You may have meant to include Copco No. 1 Dam in measure 2P because your entry on this issue, number 19, in Table 5-2, indicates that temperature control device feasibility and implementation would be developed for both Copco No. 1 and Iron Gate Dams and this recommendation was not discussed in your Section 10(j) letter to us dated October 5, 2006.

As you point out, PacifiCorp's modeling of selective withdrawal alternatives for both Copco and Iron Gate Dams show that temperature benefits for fish could be realized downstream of both of these dams (page 3-137, lines 33-36). To improve on the thermal quality of the habitat in the Copco No. 2 bypassed reach, PacifiCorp should be required to independently evaluate the benefits of temperature control alternatives at Copco No. 1 Dam to fish and aquatic biota in the Copco No. 2 bypassed reach, and implement any identified solutions, similar to those required for Iron Gate Dam.

Recommendation 12A and Measure 6S (p. 5-6) Toxic Algae Bloom Risk Monitoring

The Staff alternative includes the development and implementation of a monitoring plan for *Microcystis aeruginosa* and its toxin in project reservoirs and immediately downstream of Iron Gate Dam. The monitoring plan for *Microcystis aeruginosa* should include *in situ* studies on the impacts of toxins from *M. aeruginosa* (microcystins) on fish and other aquatic biota of the Klamath River. Monitoring and impact studies should be conducted within and between Copco and Iron Gate reservoirs and extend downstream of Iron Gate dam as far as elevated toxin or algae levels have been detected by prior studies.

Conclusion

We find that the DEIS does not demonstrate that all of the adverse effects caused by the Project are fully mitigated by the adopted conservation measures. The Federal Power Act requires, at Section 10(j) "That in order to adequately and equitably protect, mitigate damages to, and enhance, fish and wildlife (including related spawning grounds and habitat) affected by the development, operation, and management of the project, each license issued under this Part shall include conditions for such protection, mitigation, and enhancement. Subject to paragraph (2), such conditions shall be based on recommendations received pursuant to the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) from the National Marine Fisheries Service, the United States Fish and Wildlife Service, and the State fish and wildlife agencies."

Section 10(j)(2) of the FPA requires that to reject a recommendation of an agency, the Commission must find that 1) adoption of such recommendation is inconsistent with the purposes of the FPA; and 2) the conditions selected by the Commission adequately and equitably protect, mitigate damages to, and enhance fish and wildlife resources (including related spawning grounds and habitat) affected by the development, operation, and management of the project. In addition, the section requires the Commission to provide the Service with a basis for each of these findings.

We do not believe that many of your preliminary determinations are supported by substantial evidence. The DEIS states, and the October 5, 2006, letter state in many cases that the Service recommendation provides benefits for fish and wildlife resources in the Project area and to be reintroduced to the Project area. If the Commission rejects the recommendations of the Service, it must demonstrate that its alternative will adequately and equitably protect, mitigate damages to, and enhance fish and wildlife affected by the development, operation, and management of the project. We do not believe that you have shown that the Staff alternative is adequate to protect, mitigate, and enhance fish and wildlife resources for the continuing adverse environmental impacts of project operations over the next 30-50 years. The record and the body of scientific literature demonstrate that Project operations have a direct and adverse cumulative impact to

natural resource values. These impacts will continue or perhaps worsen throughout the course of the new license if project operations remain unchanged. The Service's recommendations would, in part, help to mitigate these impacts.

For those recommendations the Commission considers to be inconsistent with law, the Commission must attempt to resolve such inconsistencies. In so doing, the FPA requires that the Commission give due weight to the expertise and statutory responsibilities of the agencies 16 USC 803(j)(2).

SPECIFIC COMMENTS

SUMMARY

Page xxvii, lines 18 - 22, lists the principal issues addressed in the draft EIS. 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 Indian Tribes and thus must, in this licensing decision, ensure that any new license for the Klamath Project protects tribal trust rights, including the protection of tribal lands, fishing and water rights, cultural resources, and other resources of concern to the Indian Tribes affected by this Project.

Page xxviii, line 22. The words "vegetation resources management plan" should read "wildlife resources management plan."

Page xxix, line 41. There are no mandatory conditions associated with East Side, West Side and Keno developments. What does the Commission propose for PacifiCorp to rehabilitate, correctly recontour, revegetate with appropriate native vegetation, and enhance these facility sites when decommissioned?

Page xxix, line 38. 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"

Page xxx, line 4. Please correct the description of the BLM River Corridor Condition. The Condition allows once weekly peaking April to October that can last from 4 hours to multiple days, depending on flow availability.

Page xxx, line 21. This summary analysis assumes that fishways are adequate for anadromous fish at J.C. Boyle. They are not. J.C. Boyle Dam has fish screening and bypass systems in place but they do not conform to current criteria for resident and anadromous fish (ALJ Decision at 29, FOF 4-8). The seals at the J.C. Boyle Dam have rendered the fish screens partially ineffective, allowing fish to be entrained in the turbines (ALJ Decision at 29, FOF 4-9). Improvements in the efficiency of the fishway at J.C. Boyle Dam would result in significant trout population migration above the dam over time (ALJ Decision at 27, FOF 3-12). The SDEIS needs to analyze adequate entrainment measures at J.C. Boyle Dam for anadromous fish as well as resident fish.

Page xxxvii. The Oregon Wild and Scenic River reach was not congressionally designated. It was designated under section 2(a)ii by the Secretary of Interior as requested by the State of Oregon.

Page xxxvii: The sentence “Such a diminishment of boating opportunities would be inconsistent with the designated ORV of whitewater boating” should not be included in the SDEIS. Under the Wild and Scenic Rivers Act, consistency determinations will be provided by the appropriate agency.

1.0 PURPOSE OF ACTION AND NEED FOR POWER

Page 1-1, lines 18 – 22. This section should mention the 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.

Page 1-3: The Klamath Project represents about 2 percent of PacifiCorp’s installed capacity. The revised analysis should also note that this is about 1 percent of total sales.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 NO-ACTION ALTERNATIVE

Page 2-8, Lines 8-10. In the SDEIS, please describe the current condition and limited effectiveness of the J.C. Boyle fish ladder.

Page 2-18, line 14-16. PacifiCorp proposes to include additional land within the Project boundary. Land associated with the Spring Creek diversion structure is not currently part of the licensed Project, but PacifiCorp proposes to include it in the Project. None of the other Action Alternatives modify this proposal.

Page 2-19; section 2.2.2: As discussed above, the DEIS provides that the proposed project would not include Keno Dam and that Keno would continue to operate as it currently does, only under the jurisdiction of the State of Oregon. The DEIS 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 Project 2082.

Additionally, the DEIS assumes that the amount and timing of water available at J.C. Boyle and Copco 1 and 2 and Iron Gate 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.

2.2 PACIFICORP’S PROPOSAL

Page 2-19, line 5-7. 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.

Page 2-20, line 31-33. The USFWS 10j recommendation for minimum instream flow for Spring Creek is to have full un-diverted flows from June 1 through September 15 and to keep 50 percent of the flow above the diversion instream during the remainder of the year, regardless of flow volume. The PacifiCorp alternative proposes to divert no flow from Spring Creek during July and August, and release 1 cfs, or inflow, downstream of the Spring Creek diversion dam for the remainder of the year (19P). The Staff Alternative modified this proposed environmental measure so that the period during which no flow would be diverted from Spring Creek would extend from June 1 to September 15.

Although FERC did concur with FWS's recommendation for no flow diverted from June 1 through September 15, they did not accept the recommendation that 50 percent of inflow be maintained between September 16-May 31 and instead recommended 1cfs for that time period. One cfs is an arbitrary designation without any corresponding analysis to justify it as an alternative. One cfs would not provide adequate habitat for fish looking for cover and interstitial places to hide and conserve energy during the winter months. It would not provide refugia from high flows on Jenny Creek. 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. This low flow, spread out over a wide channel may have the potential for winter freezing, further decreasing habitat quality. Conversely, 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 corresponding cold and warm water refugia. This flow regime would also cause a very dramatic difference between summer (up to 16.5 cfs) and winter flows (1 cfs) in a stream system where aquatic organisms are not adapted to large fluctuations. Low flows in the winter and high flows in the summer are exactly opposite of what has occurred in this basin historically and again, what the aquatic organisms in this system are adapted to. 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, the FWS proposes that PacifiCorp release 4 cfs from September 16 through May 31. By increasing the winter flows to 4 cfs, there is great potential for fish to use this stream as winter refugia and for aquatic mollusks to maintain their presence below the PacifiCorp diversion.

2.3 MODIFICATIONS TO THE PROPOSED ACTION

Page 2-31 to 2-42. BLM conditions use the word "shall" instead of "should" as written in the DEIS.

Page 2-45, line 36-37. The FWS's Section 10(j) recommendation for Spring Creek includes a means for fish passage within Spring Creek above and below the diversion dam. PacifiCorp's proposal includes new fish ladders and screens at Spring Creek diversion dam for resident fish. The Staff Alternative does not provide for upstream or downstream resident fish passage at Spring Creek diversion dam.

With improved flow conditions on Spring Creek, the amount and condition of fish habitat would also improve, as would the numbers of fish utilizing this stream. Because of this, fish passage, both upstream and downstream, should be provided around the Spring Creek diversion.

Page 2-46, line 19-22. PacifiCorp should be required to provide predictive river flows in addition to real time flows provided from the USGS gage so recreational white water boaters

know when they can go boating. That way they can plan trips weeks or days in advance. Please consider in your SDEIS.

3.0 ENVIRONMENTAL CONSEQUENCES

3.1 GENERAL DESCRIPTION OF THE KLAMATH RIVER

3.3.1 Klamath River Geomorphology

Page 3-17, lines 1-5. It is incorrect 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”. Substantial percentages of the Project area channel and banks are composed of alluvium, and larger percentages of the stream bed have or had an alluvial component. In fact, 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. This is presented in PacifiCorp’s Water Resources Technical Report. There is also significant alluvial bank erosion occurring during peaking operations.

Pages 3-22 to 3-23. The geomorphological conclusions were based on inadequate sediment transport information. For example, the gravel tracer study produced both under and overestimates. There were numerous problems with PacifiCorp’s sediment studies and this information can be found in the post-hearing brief. These comments apply to table 3-4 also.

Page 3-23, lines 35-37. Base flows are also important in establishment of riparian vegetation.

Page 3-26, lines 31-33. *“Geomorphic characteristics vary considerably throughout the J.C. Boyle bypassed and peaking reaches. Nonetheless, the relatively narrow band of riparian vegetation does not appear to substantially affect the formation and persistence of bedforms in the active channel or riparian zones. Even in alluvial portions of the reach downstream of the gorge, channel-forming processes do not currently appear to be strongly linked to riparian vegetation.”*

It is unrealistic to combine generalizations on the bypass reach and the peaking reach into one conclusion as the hydrologic patterns affecting the geomorphology in these two reaches is significantly different. This is evidenced by the extreme differences in the duration of bed-mobilizing flows with and without Project, as documented in Table 3-6. Alluvial portions of the reach **are** affected by channel-forming processes and this **is** strongly linked to riparian vegetation. The connections between geomorphology and riparian vegetation are inadequate. The connections between geomorphology and riparian vegetation are inadequately addressed in the DEIS and should be fully explained in the SDEIS. These connections are findings of fact that can be found in the post-hearing brief and judge’s decision.

Page 3-28, line 27-32. The issue of Project-related flow effects to BLM sites (cultural resources) within the J.C. Boyle peaking reach (including the site referred to by FERC) has been addressed within an ALJ order dated August 11, 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 expense and in cooperation/consultation with BLM) to determine if

PacifiCorp's flow operations are causing erosion. Please present and discuss the information in the SDEIS.

Page 3-31, line 29-37. This paragraph 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. How will PacifiCorp restore the emergency spillway slope failure?

Page 3-32, line 20-30. These paragraphs identify the need to come up with an alternate system for spilling water because of the severe damage operation of the Project has already caused. However, it does not discuss the effects from either restoring the existing spillway slope failure or leaving it in the degraded condition as it exists now. PacifiCorp cannot be allowed to just remove this from the Project boundary and leave it to the Bureau of Land Management to restore.

Page 3-34, lines 14-33. The bed mobilization thresholds determined by PacifiCorp are inconclusive because of the inadequacies of their studies. Please present and discuss the information in the SDEIS.

Page 3-35, lines 16-33. Page 3-38, lines 1-8. Tables 3-5 and 3-6. 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. This was detailed in the post-hearing brief. Please present and discuss the information in the SDEIS.

Page 3-35, lines 22-23. "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.

Page 3-38. Some of the problems with the gravel tracer study are outlined here, but not all of them. For example, it was biased to select gravels 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 set off interpretations of Project effects that are unfounded.

Page 3-38, lines 9-10, and page 3-39, lines 1-10. FERC states that the PacifiCorp data was used for their analysis because there was no other data to propose an alteration. 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.

Page 3-40, lines 3-19. The BLM gravel augmentation measure makes rough minimum estimates based on information available from PacifiCorp. BLM reserves the specification of gravel augmentation quantity and grain sizes necessary to meet a multitude of management objectives, including a quantity sufficient to restore deficits from over 50 years of cumulative sediment retention. Based on monitoring information, BLM will determine the specification of sediment augmentation quantity and grain sizes necessary. Monitoring information is likely to show that larger amounts of sediment (than the rough minimum estimates) will be necessary to overcome the large current sediment deficit and meet BLM's multiple objectives.

Page 3-42, line 5. One of the major Project-related sediment barriers is J.C. Boyle Dam.

Page 3-48. In the FERC analysis, gravel augmentation as proposed by the state, other federal agencies, and tribes only addresses gravel augmentation needs from a spawning habitat perspective. The BLM Condition requires gravel augmentation that would provide for a wide range of gravel sizes and finer grained sediment. Gravel augmentation in the BLM Condition is important for spawning habitat, stream channel complexity, and for riparian vegetation. Finer-sized material would be needed for establishment of desirable riparian vegetation. In the SDEIS, FERC should assess the need for an increased maximum quantity of sediment in light of new information provided by Dr. Cluer in his testimony and during the trial type hearings.

Page 3-51 to 3-52. 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 by FERC in this section. See the post-hearing brief and judge's findings of fact concerning the impacts caused by the Project in promoting reed canarygrass in the bypassed and peaking reaches. Please present and discuss the information in the SDEIS.

Page 3-54, line 3-57. Dam removal questions and concerns have recently received needed information available in a report from the California Coastal Commission. Please include this information in revising your analysis of dam removal alternatives for the SDEIS.

Page 3-58, line 32. In the SDEIS, please define minor and short term.

3.3.2 Water Resources

Page 3-63, lines 4-15: As clarification, there are only about 150,000 irrigated agricultural acres within the Reclamation Project that are served by Upper Klamath Lake and the Klamath River.

Page 3-63; Klamath Irrigation Project: The DEIS states that the "net use of irrigation project water is 2.0 acre-feet per acre" including the National Wildlife Refuges. It is unclear as to the exact source of this information since the net annual use of water for the Project is approximately 1.25 acre-feet per acre. In comparison, the gross diversion for the project is on the order of slightly more than 2.5 acre-feet per acre. Reclamation would be happy to provide FERC with detailed information regarding project water use specifics.

Page 3-126, line 1-8. FERC concludes 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. Flows in the bypassed reach should be based on a percentage of inflow as required by the BLM Condition. The rationale is described in the BLM River Corridor Management Condition. If flows are based on a percentage of inflow, the Spencer Creek gage would be a PacifiCorp responsibility.

Page 3-130, line 18-24. FERC concludes that a plan would be appropriate for streamflow monitoring and reporting. BLM requires gages in specific locations and a system for reporting this data. The locations for the gages and method of reporting are justified in the BLM River Corridor Management Condition.

Page 3-133, lines 19-20, states that flows through Keno Reservoir are a function of Reclamation's need to meet the 2002 NOAA biological opinion flow requirements below Iron Gate Dam. Page 3-68, line 15, states that Keno operations allow consistent operation of irrigation canals and pumps.

Pages 3-144 and 5-25. We support implementation of the water quality management plan, as the Klamath River clearly has serious water quality issues. We are glad to see that solutions will be proposed in the plan. The Department has specific concerns regarding water quality effects on recreation users and aquatic species. The algae *Microcystis aeruginosa*, can produce a toxin that is a threat to human health. The SDEIS 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 as far as elevated toxin or algae levels have been detected by prior studies. The 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

Page 3-169, line 5-6. In the SDEIS, please define "often" and "degraded" in regard to water quality, including the seasonal nature (summer months of the year) and variability of change in the water quality parameter.

Page 3-169, line 34. In the SDEIS, please describe the current condition and limited effectiveness of the J.C. Boyle fish ladder

3.3.3 Aquatic Resources

Page 3-211, line 31. The DEIS states that Klamath River steelhead appear to be resistant to *C. shasta*. The SDEIS should state that within the Klamath River system, steelhead trout are resistant to *C. shasta* (ALJ Decision at 22, FOF 2B-18)..

Page 3-235, line 19-20. In the SDEIS, please provide current data with supports the conclusion J.C. Boyle bypass reach is one of the two most popular angling reaches.

Page 3-235, line 34-35. In the SDEIS, please provide the size of the thermal refugia (width and length) provided by the cold water springs for the different flow alternatives and how many fish would be provided cold water holding refugia under the different flows.

Page 3-239, line 6. The BLM does not require a 2 inch per hour ramp rate for the seasonal high flow. The condition states: "Not exceed an up ramp rate or down ramp rate of two inches per hour when conducting controlled flow events (e.g., scheduled maintenance and changes in minimum flow requirements), **except during implementation of the seasonal high flow.**" [See Condition 4 - A.1.(c).]

Page 3-239, Table 3-59. In the SDEIS, please include any recent data for catch rate. The 1979-1984 angler survey data is over 20 years old and the 2002 data is from a PacifiCorp study that may not accurately represent recreational catch rate.

Page 3-239, lines 16-18. The statement 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 that is not reflective of trout densities (see Snedaker and Hooton rebuttal testimonies issue 3 from the hearing).

Page 3-247, lines 1-6. The DEIS 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 depredated prior to detection (Anglin et al. 2006). Recent observations of fish stranding due to ramping in the peaking reach (Dunsmoor 2006) should be included in the discussion. Further, findings from the Klamath Hearings should be incorporated into the SDEIS. FOF 16-8 (ALJ Decision at 45) states that "PacifiCorp's peaking operations cause high mortality to fish and other aquatic organisms through stranding". Finding 16-9 (ALJ Decision at 46) states that "[O]n July 5, 2006, a severe stranding along 225 feet of the peaking reach was documented near Frain Ranch. '[A]bout 5,000 fish, more crayfish, and an order of magnitude more aquatic insects perished in a single peaking cycle...' No redband trout mortalities were documented, however few trout fry exist in the peaking reach." Finding 16-10 (ALJ Decision at 46) states that "[T]he severe loss of fish and other aquatic life on July 2006 is directly attributable to PacifiCorp's peaking operations". Finding 16-15 (ALJ Decision at 46) states that "Project peaking operations kill, through stranding, large numbers of young fish and aquatic invertebrates that are the primary prey food for trout."

Page 3-263, line 30. The DEIS 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 O&M costs (Appendix A, page 14). The EIS need to be revised to include this information.

Page 3-263, line 4. The DEIS fails to mention the fish ladder completed by Reclamation in 2005 and capable of passing all anadromous fish species found is currently operating at Link River Dam. The EIS need to be revised to include this information (also see comments on page 3-270, line 23).

Page 3-263, line 32. In regard to disease risks to anadromous fish associated with reintroduction, see ALJ Decision at 23, FOF 2B-22.

Page 3-266. Tables 3-68 through 3-70 shows that thermal stress levels for Chinook salmon and steelhead, based on temperature and DO, are nearly identical at Walker Bridge and at Keno Dam. Despite these stress levels, Chinook 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 and steelhead would be able to use habitat near Keno Dam most of the year as well.

Page 3-269, line 3. Impingement of larval suckers may very well occur with salmonid criteria screens. However, the U.S. Fish and Wildlife Service has consulted with the Bureau of 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 the life stages of federally listed suckers the Service is most interested in (USDI Fish and Wildlife Service 2002). Moursund et al. (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 SDEIS needs to be revised include these facts.

Page 3-269, line 24. 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. Wild Chinook outmigrants from spring creeks such as Fall Creek and Bogus Creek and the Shasta River would enter the mainstem primarily in February and March (Coots 1954; Tom Shaw, USFWS, pers. comm.), thus minimizing exposure to elevated temperature regimes and disease risk. 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. There is no evidence that adult Chinook die offs in the Klamath River are associated any long-term water temperature or disease trends.

Page 3-269, line 32. Despite the study requests (U.S. Department of the Interior 2004); (National Marine Fisheries Service 2003 DLA) and acknowledgement of the issue (PacifiCorp 2003); **PacifiCorp 2004a**; (PacifiCorp 2004a); (PacifiCorp 2004b), PacifiCorp has not provided site-specific evidence, materials, study results, or data that substantiate its position that Project tailrace configurations will not have adverse impacts on anadromous fish FERC (Federal Energy Regulatory Commission 1994) identifies tailrace barriers as a feasible, common solution to injury or delay at tailraces. The SDEIS should adequately analyze the benefits of tailrace barriers at the Project and consider an alternative that includes adequate, independently conducted studies of the potential need for tailrace barriers at Copco 2, Copco 1, J.C. Boyle, Eastside, and Westside facilities.

Page 3-270, line 23. The DEIS fails to mention the fish ladder completed by Reclamation in 2005 and capable of passing all anadromous fish species found above Iron Gate Dam is currently operating at Link River Dam. Because of this ladder, 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. The SDEIS need to be revised to include this information.

Page 3-270, line 23. The Agencies do not believe that the ability of this ladder to pass salmon and steelhead, when it is properly maintained, is in question at this time. The Agencies did not prescribe a new ladder, but prescribed modifications to the existing ladder to accommodate lamprey. The SDEIS need to be revised to include this information.

Page 3-270, line 1. The DEIS is incorrect in stating that passage at Keno would provide little benefit to trout in the Keno reach. As recently as the 1950's and 1960's an intrastream migration of resident rainbow occurred in the Klamath River from the Frain Ranch (below Keno Dam) to Upper Klamath Lake area (above Keno Dam) (Fortune et al. 1966). The findings of the ALJ clearly show that the Project now contains habitat for resident trout (ALJ Decision at 26, FOF 3-1); that prior to the construction of dams, redband trout within the Project area belonged to a single, large intermixing population throughout the Klamath River Basin (ALJ Decision at 26, FOF 3-4), and that migration is one of several defining life history characteristics of trout (ALJ Decision at 27, FOF 3-7). The findings of the ALJ also show that life history strategies (such as

spawning above the J.C. Boyle Dam) are denied to the resident trout population below the dam (ALJ Decision at 26, FOF 3-6); the Project restricts migration of resident fish within the mainstem and into and out of the tributaries (ALJ Decision at 27, 3-8). The EIS need to be revised to adequately analyze the needs of resident trout and benefits of passage to resident trout at Keno Dam.

Page 3-272, line 11. The DEIS 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 habitat above Keno Dam. While the DEIS 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 other), the analysis arbitrarily limits the estimate of miles of fish habitat gained from passage to the Project boundaries and 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). This analysis arbitrary limits distorts and greatly underestimates the gains associated with passage. These are real benefits, in spite of the fact that they may be outside the Project boundary. The SDEIS 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 analyses of the alternatives.

Page 3-281, line 33. The DEIS refers to the high incidence of disease in fall-run Chinook outmigrants in late April. The EIS has too narrowly focused on primarily hatchery fall run Chinook outmigrants. Data for outmigration for at least 2003 and 2004, show a peak for wild fish outmigrants occurring in late March or early April (USDI Fish and Wildlife Service 2006). This outmigration is 3 weeks to 2 months earlier the peak for hatchery fish. Wild fall run fish from above Iron Gate Dam (at least from the Project reach) would likely exhibit similar timing (Coots (1954) found Fall Creek outmigrants all out by end of March historically). Reintroduced spring-run Chinook would generally outmigrate during the same time period. These wild fish thus would avoid, for the most part, the high incidence disease period beginning in late April. The lower infection rates reported in 2006 to date are likely related to substantially higher flows compared to 2004 and 2005. The SDEIS needs to be revised to adequately analyze mainstem impacts of disease on earlier migrating wild fish, reintroduced outmigrant fish, reintroduced spring-run Chinook, steelhead, coho, Pacific lamprey, and on all fish in high water years such as 2006.

Page 3-282, line 1. Since 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 (ALJ Decision at 23, FOF 2B-22). The EIS needs to be revised to reflect these findings and adequately analyze, over the term of a new license, the benefits of volitional fishways.

P 3-285, line 19. The DEIS 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. This conclusion for the most part ignores the avoidance of high disease incidence period by wild Chinook currently present, the

outmigration period of reintroduced fall run Chinook, the outmigration period of reintroduced spring-run Chinook, and the resistance to disease of steelhead, coho, and Pacific Lamprey. The SDEIS needs to be revised to adequately analyze mainstem impacts of disease on earlier migrating wild fish, reintroduced outmigrant fish, spring-run Chinook, steelhead, coho, Pacific lamprey, and on all fish in high water years such as 2006.

Page 3-286 Figure 3-80. For context, this figure should include weekly sample sizes with bars.

Page 3-286, line 15. The DEIS refers to Tables 2.2-2 and 2.2-5. These tables do not exist in the DEIS.

Page 3-286, line 16. The DEIS states that stressful conditions for juvenile fall Chinook generally starting in late May, which coincides with the season when increased collections of diseased and dead juvenile fall Chinook were observed during screw-trap monitoring in 2004 (figure 3-80). The SDEIS needs to be revised to expand its analysis of stressful conditions to include other anadromous fish species, such as steelhead, coho salmon, spring-run Chinook salmon, and Pacific lamprey, and other years, such as 2006.

Page 3-287 Lines 1-3 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.”

Page 3-289, line 27. “several mechanisms..” should be changed to “several potential mechanisms.”

Page 3-289, lines 35-39: The author 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 Creek. 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 IGD. *Cladophora* would be less likely to establish permanent colonies in the highly mobile bedload located upstream of the dams. Therefore, the Services don't believe removing the lower dams would facilitate *Cladophora* migration upstream into currently inundated areas, but the topic needs further study prior to making a definitive statement on the matter.

Page 3-289, line 46. “..would result..” should be changed to “..would likely result..”

Page 3-290, line 7. “Restoring natural sediment transport processes would..” should be changed to “Restoring natural sediment transport processes would likely...”

Page 3-291, line 26. The DEIS concludes here that volitional passage at all Project dams would provide little or no benefits unless disease issues in the downstream migratory corridor are addressed. This basis for this conclusion is based too narrowly upon impacts to fall Chinook outmigrants (primarily hatchery juveniles) and overlooks benefits to spring-run Chinook, steelhead, lamprey, coho salmon, and, to some degree, wild fall Chinook outmigrants. Within

the Klamath River system, steelhead trout are resistant to the main disease concern, *C. shasta* (ALJ Decision at 22, FOF 2B-18) and coho salmon are less resistant to *C. shasta* than steelhead trout, but are more resistant to the virus than Chinook salmon (ALJ Decision at 23, FOF 2B-19). No disease issues have been raised regarding Pacific lamprey. The SDEIS needs to include analysis of benefits of passage for these three species.

Page 3-294, lines 23-26: Document 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." The Service's are not sure what evidence supports this assertion. The PacifiCorp study that evaluated predation risks to migrating juvenile Chinook salmon within the reservoir system was deemed lacking and inconclusive. Table 3-73 compares estimated survival rates for volitional versus trap-and-truck scenarios through sections of the upper Klamath River, but the tables do 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 their assertion.

Page 3-294 (line 32). Beginning on page C-47 of the Department's fishway prescriptions, NMFS/Interior refer to studies that attribute injuries in migrating salmonids to powerhouse structures associated with tailrace structures. Further, we are unaware of any studies done by the Applicant showing these measures are not required. The EIS needs to be revised to reflect these studies and adequately analyze the benefits of tailrace structures over the term of a new license.

Page 3-295 ('Risks' in Table 3-72, PacifiCorp Alternative). See comments regarding Page 3-291, line 26.

Page 3-295 ('Risks' in Table 3-72, Remove Copco and Iron Gate Dams). The concern regarding potential introduction of the *Infectious Hematopoietic Necrosis* (IHN) virus has been addressed by the ALJ's findings: the existence of virus IHN in the Klamath River system is exceedingly rare (ALJ Decision at 20, FOF 2B-3) and since 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 (ALJ Decision at 23, FOF 2B-22). The EIS needs to be revised to reflect these findings and adequately analyze, over the term of a new license, the benefits of volitional fishways.

Page 3-298 (Table 3-76). This table does not include an analysis of adult fall Chinook or any other species that could be accommodated by spawning habitat above the Keno reach. The SDEIS needs to adequately analyze, over the term of a new license, the benefits of volitional fishways for all species in and above the Project reach.

page 3-299, lines 1-7; It is unclear to the Services how depositing a small number of adult Chinook salmon into a stream reach and then sampling outmigration will 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.

Page 3-303, line 39. FERC's conclusion (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 (LRP) for the Klamath River Basin Fisheries Conservation Area Fisheries Restoration Program. Specifically, the objectives of the LRP include: 1) that 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 (pg 4-44, para 1 of LRP) and 2) that the TF 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 (pg 4-44, para 1 of LRP). Siskiyou County was a member of the Task Force and signatory to the LRP.

Page 3-312, line 5. Within the Klamath River system, steelhead trout are resistant to the main disease concern, *C. shasta* (ALJ Decision at 22, FOF 2B-18).

3.3.4 Terrestrial Resources

Page 3-321, line 37-40. Discussion should include the white-headed woodpecker (a BLM sensitive species).

Page 3-326, line 6-11. 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. This flora does not record a common name for this species. 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.

It is hard to determine the effects of the Project without the vegetation management plan and the effects with the vegetation management plan. Further, it is hard to determine where the proposed vegetation management plan would be applied on the ground.

Page 3-343, line 38-42.

PacifiCorp proposes to limit the noxious weed management portion of its proposed vegetation management plan to areas needed to Project operations and within the Project boundary. However, other landowners are required by state and county laws and regulations to manage noxious weeds on all their lands. It is not really clear why PacifiCorp thinks that it should be exempt from these requirements.

Page 3-343, line 43. The inventory conducted by PacifiCorp for noxious weeds was adequate on the lands surveyed, thus a new survey is not needed. However, 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.

Page 3-343, line 47-49. Again, PacifiCorp proposes focusing its noxious weed activities only within the “Project boundary” which avoids its landowner responsibilities and violated the principles on integrated noxious weed management. The effects and cumulative effects of limiting weed management to only a portion of their ownership should be analyzed and disclosed.

Page 3-344, line 2-3. The assessment that the special status plant surveys were inadequate was based partially on the fact that populations of additional special status plant species have subsequently been documented in the area affected by Project operations. It is not clear why PacifiCorp disagrees with this assessment.

Page 3-344, line 3-5. PacifiCorp claims that they used stakeholder-approved methods, but then states that they were only applied to predetermined potential habitat. The intuitive controlled method of survey is conducted across the entire area affected by a Project.

Page 3-345, line 35-39. Here it states that a coordinated noxious weed management plan would be applied to “all Project lands.” However, on lines 20-21, PacifiCorp recognizes that “Both federal and state laws require landowners to manage noxious weeds within their ownerships.”

Page 3-345, line 40-42. These two sentences seem to conflict. 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...” Which is it??

Page 3-345, line 42-45. Eradication is not the only objective of an integrated weed management program. For some species, limiting the impacts to 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. For the yellow starthistle example cited, BLM treats the roadsides chemically to limit spread via vehicles and other road traffic, but uses the release of the suite of biological control organisms available to treat the populations on the steep slopes of the canyon walls. A low probability of eradication is not an excuse for lack of management.

Page 3-346, line 3-28. 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.

Page 3-354, line 32-36. PacifiCorp proposes to wait to finalize the “road access management plan” and thus the DEIS does not disclose what the effects will be from implementing road actions.

Page 3-357, line 5-8. If PacifiCorp waits to finalize the “road access management plan”, and the DEIS does not identify what unnecessary roads would be closed or what seasonal restrictions would be established, how can the effects from implementing road actions be disclosed to the public?

3.3.5 Threatened and Endangered Species

Page 3-371, line 15. Worden is in Oregon, not California.

Page 3-380 & 3-381, all. Since Applegate's milkvetch is federally listed as endangered, the new site documented by PacifiCorp's surveys should be included in their special status plant species management plan regardless of the Project boundary. The plan could include a cooperative management agreement with USFWS, ODA and/or TNC 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 DEIS, this site may be less subject to threats than the much larger Ewana Flat site managed by The Nature Conservancy.

Page 3-378, lines 9-12; The document seems to disregard non-natal rearing opportunities that exist for mainstem spawned coho salmon fry, as well as coho 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 get funded through the California's Klamath restoration funding cycle this year.

3.3.6 Recreational Resources

Page 3-389, line 7-10. The 11 mile segment of the upper Klamath River was designated a Wild and Scenic River under section 2(a) (ii) of the Wild and Scenic River 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."

Page 3-391, line 16-18. FERC has identified a need for RV spaces with hookups. As the current population ages, the demand for these facilities will likely increase.

Page 3-392, line 25-36. Facilities along the upper Klamath River (J.C. Boyle, Copco and Irongate Reservoirs) for RV (hook-up) camping 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.

Page 3-398, Table 3-86. For the bypass reach, the staff alternative flow recommendations (200 cfs dam release) are at the low end of the acceptable range for angling and PacifiCorp proposed dam release of 100 cfs is below the acceptable range. 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 (300-400 cfs). The EIS should recognize that the BLM prescribed flow release of 470 cfs is only slightly above the optimal range and is in the middle of the acceptable range.

Our interpretation of Table 3-86 suggests that optimal fishing flows (300-400 cfs) would be eliminated during all times except when spill is occurring since flows recommended by FERC (200 cfs) and proposed by PacifiCorp (either 100 or 200 cfs) are below the optimal range. This is contrary to what is described in Figures 3-89 through 3-91.

The DEIS States that PacifiCorp reports that angling from Powerhouse to Stateline is low, possibly due to access. We agree, but point out that this contradicts PacifiCorp analysis that states that one reason that there are few large, older trout in the Peaking reach compared to the Keno reach is that there is that the peaking reach receives more fishing pressure because of road accessibility.

Page 3-400, line 23-37. 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 license and unknown effect on the Keno Recreation Area by PacifiCorp could shift some recreation demand for boating, day use and camping to J.C. Boyle Reservoir.

Pag 3-402 – Recreation in the Boyle reach is not limited to whitewater boating. PacifiCorp estimated 12,647 annual recreation days, of which 5,252 were commercial boaters. (Page 3-46, Recreation Resources FTR, FLA). “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 appear to be common on summer weekends, and again during the fall hunting season. (Page 2-74, Recreation Resources FTR, FLA).

Page 3-402 Table 3-89. It should be noted that the permittees all run other rivers, and most permittees also provide guided fishing trips.

Page 3-403, line 28-30. Timing of peaking releases and advance knowledge of scheduled releases are necessary for outfitters to market, sell and conduct trips. Afternoon peaking has also reduced the marketability of overnight boating trips, due to the extended “down time” on the second day, waiting for sufficient peaking flow for boating. Advanced knowledge of anticipated peaking operations is preferred for outfitters to book future trips with clients planning vacations coming from long distances. Without advance knowledge of expected flow release schedule, the marketing opportunity and sales of commercial trips are reduced.

Annual outfitter information meetings have been held since the early 1980s. PacifiCorp has participated in these meetings for information sharing purposes, including providing information about anticipated Project maintenance, safety concerns, along with Projected flows for the season.

Page 3-403, line 37-43. The Spring Island boater access was constructed by the BLM in the early 1980s. The facility was constructed after PacifiCorp prohibited launching from just above the J.C. Boyle powerhouse. Commercial outfitters requested the BLM to provide a suitable launch site below the powerhouse. As a direct result of PacifiCorp operations, and because float boating is directly related to hydropower releases, the BLM believes Spring Island boater access should be within the Project boundary.

Page 3-403, line 26-27. The BLM concurs that 1500 cfs is an optimal white water boating flow, but it is not the minimum. Please correct in the SDEIS.

Page 3-405, line 1-6. 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.

Page 3-405, line 29-30. While a 4 hour launch window is desirable and provides adequate time for completing a whitewater boating trip, a smaller window of 1-2 hours allow sufficient time for a float trip, as long as boaters are aware of the narrow float window.

Page 3-410, line 8-9. Facilities along the upper Klamath River (J.C. Boyle, Copco and Irongate Reservoirs) for Recreational Vehicle (RV spaces w/hook-ups) camping units 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.

Pages 3-409 and 3-410 We appreciate FERC's recognition of areas of latent recreational demand, including non-motorized trail use. While 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. FERC's regulations require consideration of both existing and future potential recreational demand. 18 C.F.R. §§ 2.7, 4.41. It might be especially 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.

We support the proposed reservoir-based trail on J.C. Boyle reservoir. However, we do not agree with FERC that a river-based trail is not needed. There is a clear need for river-based trails. Reservoir-based use and river-based use result in very different experiences. We believe 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.

Page 3-411, line 5-17. The BLM agrees that the RRMP should be completed in consultation with the broad group of recreation stakeholders. Offering advisory role participation to Oregon Fish and Wildlife and relevant tribal representatives is appropriate.

Page 3-412, line 33-45. The DEIS incorrectly identifies the Keno Recreation Area located on lands of the United States managed by the Bureau of Land Management. We believe this should refer to the lands managed by the Bureau of Reclamation.

The potential loss of Keno Recreation Area recreation facilities and reservoir access are problematic. 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 this DEIS. There is no assurance that Keno Recreation area will be operated by PacifiCorp or any other entity if the development is removed from the Project boundary.

Page 3-413, Table 3-95. The BLM agrees with FERC's recommendation of fully developing the Boyle Bluff development within 10 years of license issuance. In addition to providing potable water and restroom, the need for an on-site host and developed host site at the proposed Boyle Bluff development should be considered. The BLM is familiar with the existing uses of this area. Many of the uses are problematic, i.e. young adults frequently use the area for partying, jumping off of bluffs, late night activities, littering, etc. Having an on-site host will greatly alleviate these concerns and can quickly respond 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 should also be provided at the time of site development, as a delay would likely lead to a continuation of the existing problematic behaviors.

Page 3-415, line 19-45. The DEIS does not disclose the effects from development and operation of recreation facilities, the SDEIS should document the effects.

Page 3-415, line 25-30. The BLM agrees with the analysis that it may be desirable to continue to provide recreational access to the east side of the reservoir Highway 66 bridge crossing. It might be desirable to separate day-use boating and associated activities from other day-use (picnicking).

Page 3-416, line 36-47. 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. Topsy campground and Topsy Recreation Site are one in the same.

Page 3-417, line 37-42. 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 takeout. Vehicle access on the road is compromised and resource damage occurs because of the muddy conditions created by the leaking canal.

Page 3-418, line 1-13. The Spring Island boat launch is accessed by the Project road within the existing license boundary. PacifiCorp has proposed 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. No other developed whitewater boating facility is available for launches below the J.C. Boyle Powerhouse. The vast majority of use at Spring Island boat launch is for launching of commercial float trips during the summer months. The original boat launch facility located at the powerhouse shed site was signed to prevent launches due to boater safety. Project boundaries must "enclose only those lands necessary for operation and maintenance of the Project and for other Project purposes, such as recreation, shoreline control, or protection of the environmental resources." 18 CFR §4.41(h)(2) (page 3-467)

The BLM is unsure what determining factors or rationale FERC has used regarding whether Spring Island provides access to Project lands, waters or Project induced recreation. Please include rationale in your SDEIS.

Spring Island boat launch should be included within the Project boundary just as Stateline Take-out and Fishing Access 1 are included in the license (as they are the primary boating take-out points). FERC has added the existing road from Ager-Beswick road to Stateline take-out into the Project boundary. PacifiCorp has proposed a small boat and kayak launch facility below J.C. Boyle dam (page 3-418, lines 4-6. While this new facility will likely see use only during spring/early summer spill events, Spring Island will continue to see use primarily during summer hydropower peaking events. For these reasons, FERC should likewise include the access road below the turn-around to Spring Island (along with Spring Island boat launch) in the Project boundary.

Page 3-424, line 19-27. It is unclear if PacifiCorp is planning to provide a seasonal presence for the J.C. Boyle reservoir. The BLM believes it will be difficult for a single ranger based in the Irongate or Copco area to effectively monitor use at J.C Boyle Reservoir, due to the considerable driving time between the areas. Page 3-424, footnote 108 indicates PacifiCorp would coordinate its patrols with the BLM and Klamath County law enforcement patrols in J.C. Boyle Reservoir and J.C. Boyle bypassed reach. The BLM believes it will be difficult for PacifiCorp to provide adequate seasonal presence for the area with the existing limited BLM and county law enforcement resources. The proposed PacifiCorp recreation developments (not including Topsy campground) may significantly increase use of the area and potential for use conflicts. PacifiCorp seeks to contract with Siskiyou County for law enforcement patrols. The BLM is familiar with the historical use patterns of the area and associated problem behaviors. The BLM 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. These efforts are needed to: maximize management presence and coverage, address changing visitor management needs, provide backup coverage when needed, and better enforce new recreation site development and dispersed site use restrictions.

Pages 3-418 and Page 5-51. (J.C. Boyle bypass and peaking reach access points)

We do not agree with FERC that Spring Island Boater Access, 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 DEIS 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. Therefore, these sites do accommodate Project-related recreation and should be included in the Project boundary.

We agree with FERC that these sites do need improvement, and we believe that PacifiCorp has an obligation to contribute to this. We support FERC's rationale to include the State-line and fishing access sites 1-6 in the license. These sites are important take-out points for whitewater boaters and fishing access sites. However, we do 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. In order to have complete access, all of these sites need to be improved and included in the license.

The DEIS 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.” We do not believe access sites at the bypass reach could be substituted for put-in sites for the peaking reach, largely because flows suitable for whitewater boating are not included in the preferred alternative for the bypass reach. If either the Preferred Alternative or the Staff Alternative with Mandatory Conditions is selected, we believe these sites need to be included 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 would improve the safety of the river users, allowing them to easily scope rapids before running them.

We recommend FERC include all of the river access sites and scouting trails in the Project boundary, and that FERC require improvements for all of the sites in the license.

We do agree that the proposed bypass reach sites are needed for public access to the bypass reach. Given the proposed flow regime in the bypass reach, these sites will likely be used primarily for fishing with occasional boating use.

Page 3-424, line 1-7. Interior is supportive of the proposed river access improvements below Iron Gate reservoir. We recognize that the I-5 and Indian Creek river access sites are further downstream from the Project boundary. These sites do provide for access to river uses (e.g., whitewater boating and fishing). We recommend that PacifiCorp contribute to management of these sites in partnership with others. We agree that it is not PacifiCorp’s full responsibility, but believe PacifiCorp should participate in management and be part of the overall solution.

Since the Iron Gate dam became operational in the mid-1960s, Project operations have greatly increased the stability and reliability of river flows downstream. Regulated river flow conditions have resulted in a unique whitewater boating setting for this segment of the Klamath River, with distinct types of river attractions, boating, and river trips. This segment is also designated a Wild and Scenic River.

Commercial outfitters comprise 80 percent of both the whitewater boating and recreational fishing use between Iron Gate dam and the Salmon River. In addition, the communities around the Middle Klamath River depend on the economic benefit that the recreational boating and fishing revenue bring. This is particularly important, because these communities qualify as economically disadvantaged populations. These communities have high populations of Native Americans (e.g., the Karuk Tribe) that depend on the income opportunities provided by the river’s fisheries and recreational use. Therefore, the proposed improvements will address environmental justice concerns as well.

The river access improvements will help to protect and enhance this part of the river, and therefore continue to help meet recreational, economic, and environmental justice needs.

Page 3-426, line 41-47. As a part of PacifiCorp’s annual recreation meetings, it is important for outfitters to have information or projections about expected seasonal flow conditions, timing and

duration of water releases. This information is needed for companies to offer advanced booking of trips. Earlier peaking releases protect the interests of outfitters by enabling them to conduct trips in a timely manner.

Page 3-428, line 24-35. The BLM agrees with allowing PacifiCorp to charge nominal fees to help recover O & M costs associated with recreation facilities. Day use fees have been successfully used at Topsy campground, along with other measures, to reduce inappropriate behaviors. In addition, PacifiCorp should also consider occasionally waiving fees or offering “fee free” days to accommodate those that have limited income. Agencies such as BLM offer free access to facilities during the annual free fishing Saturday in early June.

Page 3-428 to Page 3-446. The analysis of white water boating opportunities should include the hearing results including several critical findings regarding white water rafting and the benefits of instream flows in meeting multiple resource management objectives.

In addition, we recommend that this analysis for the J.C. Boyle bypass reach be expanded to include opportunities for rafting as well, and recognize that this bypass reach does provide for a high-quality experience when flows are available. The recreation flow study completed by PacifiCorp in 2002 for this bypass reach clearly demonstrated that it does provide a fascinating, high-quality whitewater experience for kayakers and rafters.

There are clear synergistic benefits to providing flows for boating on this bypass reach. For example, these flows would expand opportunities for both longer, multi-day trips on the Hell’s Corner reach, as well as shorter, single-day trips down to the Spring Island launch site.

FERC has consistently required recreational boating flows in bypass 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 bypass reach. We recommend FERC staff reconsider its analysis and refer to past precedent for providing these flows.

Page 3-432, line 15-16. FERC makes the assumption that PacifiCorp would release an extra 100 cfs from the dam rather than the powerhouse. Since PacifiCorp did not specify which location the 100 cfs would be released, the impacts of both these alternatives should be examined. Acceptable angling (as defined in table 3-86) would be eliminated in the bypass reach under the PacifiCorp proposed flow if additional flow was released at the Powerhouse (100 cfs dam release) according to Table 3-86, because flow would be less than the minimum 200 cfs in the acceptable range.

Page 3-432-435. The use of “optimal” and “acceptable” flow ranges in the DEIS is very arbitrary and does not adequately describe the fishing experience for the respective river reaches. 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.

Page 3-432 Lines 16-19. The conclusion that that “almost all angling opportunities in the optimal range of flows would be eliminated under the BLM and ODFW flow measures” contradicts data in table 3-86 noted above. Also, BLM’s analysis of the flow record indicates that in drought years, flows of around 400 cfs dam release or less would be common in dry years under the BLM flow prescription. BLM 2006 memorandum and attached spreadsheet “BLM Modeled Flows at J.C. Boyle Bypassed Reach, Nov 22 2006”

Page 3-433 to 3-434, Figures 3-89 to 3-91. Our interpretation of Table 3-86 suggests that optimal fishing flows (300-400 cfs) would be eliminated during all times except when spill is occurring since flows recommended by FERC (200 cfs) and proposed by PacifiCorp (either 100 or 200 cfs) are below the stated optimal range. This is contrary to what is described in Figures 3-89 through 3-91. These figures show the number of days with optimum flows under the existing and proposed conditions

Page 3-437, line 16-19. FERC uses a 5-hour launch window as one of its factors for their analysis of whitewater boating opportunities. While 5 hours is a desirable launch window as it provides opportunities for boaters to launch at times when there is 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. This release of water enables companies to complete a float trip at about 1500 cfs, even after ramping down has occurred at the J.C. Boyle powerhouse. BLM used a minimum 4 hour peak flow for its mandatory flow conditions as a parameter to determine boatable days and FERC should be use the four hour window in the SDEIS analysis. As a historical note, during drought conditions in the early 1990s, a 1-2 hour launch window provided a sufficient duration of flow to conduct safe float trips. It is also important to note that timing of releases is a critical factor for commercial boating.

Page 3-438, line 10-13. The DEIS page 3-429 and 3-438 line 11 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.” While this event would be once a week, it would not necessarily be a one-day event (line 24). If sufficient water were available, this higher flow would be sustained for more than one day, allowing additional float boating opportunities.

Page 3-438, lines 33-44 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 “wadeability” at various flows, not “fishing opportunities”

It should be recognized that the BLM 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.

This section should have a discussion of the impacts of anadromous fish re-introduction on the recreational fishery.

The discussion of impacts to fishing should consider the findings and recommendations contained in Whittaker (Whittaker et al. 2005). *Flows and Recreation: A Guide to Studies for River Professionals*. Specifically, at Page 30 it reads “Fishability studies are only one component of assessing flow needs for fishing opportunities. Fishability studies focus on access

to fishable water, offering less information about long term effects on fishing success, the fishery, or biophysical conditions. (Also see page 32-33 sidebar). 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". The PacifiCorp Recreation study evaluated only the question of wading based opportunities with respect to flow levels.

Page 3-438, line 33-37. If fishability is going to be evaluated with respect to flows, FERC should conduct its analysis using 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.

This section of the analysis should include consideration of the written testimony of Don Denman in the Klamath hearing. His testimony speaks to his recollection that the trout fishing experience in the peaking reach was outstanding before the JC Boyle project began manipulating flow levels (run of river conditions). Trout over 20 inches were common and trout spawning was observed in the Frain Ranch area of the peaking reach.

Page 3-447, line 17-35. This section should also address some other flow timing issues. As discussed on page 3-403, lines 28-30, timing of peaking releases and advance knowledge of scheduled releases are necessary for outfitters to market, sell and conduct trips. Assuming PacifiCorp follows the proposed release schedule, it is important to provide outfitters with any changes or alterations to this schedule as soon as possible (e-mail). Annual outfitter meetings have been used successfully to provide seasonal information well in advance of any scheduled changes in flow release schedule. Scheduling maintenance outages of facilities outside of the peak whitewater boating season (mid-June through mid-September) is most desirable.

Page 3-448, line 24-26. The DEIS states "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." While the opportunity for mid-summer whitewater boating would be reduced under this alternative, 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 of the upper Klamath River, 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 new business opportunities in guided fishing trips for anadromous fish.

Page 3-449, line 25-26. The DEIS incorrectly states Bureau of Land Management ownership. This should state Bureau of Reclamation ownership.

Page 3-452. It should be noted that FERC cannot issue a license until the WSRA Section 7(a) determinations have been made for the two designated river segments. The Bureau of Land Management has the authority for the Oregon segment, and the United States Forest Service and

the NPS have joint responsibility for the California segment. A combined final determination will be provided after the final EIS is issued.

Page 3-460. Table 3-101 top right paragraph – PacifiCorp has to 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.

Page 3-461, line 38-45. In the SDEIS, please provide the data or references for the 7,599 and 490 acreages.

Page 3-465, line 21-25. The reason the Bureau of Land Management indicated that the agency did not have the Road Inventory Analysis and Project Roadway Management Plan (October 2004) was that, during the time of preparation of the preliminary conditions, PacifiCorp made no effort to send BLM a copy of the Plan. BLM finally received a copy after making a verbal request and then being told a specific written request was necessary before PacifiCorp would approve release of the document. Because PacifiCorp made no effort to consult with the Bureau of Land Management when developing the Plan, and the DEIS does not disclose what the effects will be from implementing road actions, the public will not be informed of the effects of PacifiCorp's actions.

Page 3-467, line 12-19. The DEIS does not disclose the effects from PacifiCorp dropping 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).

Page 3-467, line 25-40. The DEIS does not disclose the effects from development and operation of recreation facilities.

3.3.7 Land Use and Aesthetic Resources

Page 3-468: The Staff fails to include what measures will be implemented to improve aesthetic resources for the J.C. Boyle Bypass Canal. The BLM 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.

3.3.8 Socioeconomic Resources

Page 3-487: The number of rafting days should be updated with the BLM model, as updated in the hearing record.

Page 3-492, lines 5-32: Reclamation disagrees with many of the assumptions and conclusions of the Jaeger report. The cost per acre is not consistent across the Reclamation Project, and some of the most productive lands would have a disproportionate increase in power costs to the rest of the irrigated lands. Additionally, 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.

3.3.9 Cultural Resources

Page 3-493, lines 9-15. Document does not adequately address the Area of Potential Effect (APE) for the proposed project according to the implementing regulations 36CFR 800 of the National Historic Preservation Act. Please 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 archeological sites and traditional cultural properties all the way to the mouth of the Klamath River. The Yurok Tribe argues that the APE should extend to the mouth of the Klamath River What evidence is there that this project does not affect such resources? Please explain.

Page 3-498, line 18 – 29. PacifiCorp and HRA did not consider archaeological sites located on BLM land in their analysis of a potential National Register district. The BLM believes that sites located within the J.C. Boyle peaking reach on BLM 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.

Page 3-499, line 32 and Page 3-500, line 12 and line 18. Why are Traditional Cultural Properties (TCP) identified as "potentially" eligible to the National Register of Historic Places in this section of the DEIS, whereas historic structures and archeological sites are described as eligible or not eligible to NRHP in this document. 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 Traditional Cultural Properties.

Page 3-501, line 24 – 46 . PacifiCorp acknowledges in the Cultural Resources Final Technical Report (page 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 that FERC summarizes on line 29 – 32. On the following page (3-502, lines 5 – 10) FERC indicates that Project operations include recreation and other public uses of Project lands and waters.

The issue of Project-related flow effects to BLM sites within the J.C. Boyle Peaking Reach has been addressed within an ALJ order dated August 11, 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 expense and in cooperation/consultation with BLM) to determine if PacifiCorp’s flow operations are causing erosion.

Page 3-503 line 38. Why is there no concurrence from the California State Historic Preservation Officer or Tribes on the APE? Was this because tribes and the California SHPO disagree with Pacific Corps and FERCs definition of the APE, or was there simply no comment? At minimum this needs to be explained in the SDEIS

Page 3-504, line 1 – 19. FERC indicates 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 support the BLM contention that surveys within the APE are required and sites within the APE on BLM land need to be included in the HPMP.

Page 3-506, line 30 – 36. FERC concludes that PacifiCorp should complete required surveys within BLM identified units B, D, F, G, L, M, N, O and P. FERC 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. BLM contends 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.

Page 3-506, line 40. How is the FERC 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 DEIS, 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.

Page 3-507, line 18 – 23. Review of the HPMP every three years should include comments from not only the SHPOs and tribes, but BLM as well.

Page 3-507, lines 7-43. There is no discussion of how adverse effect to TCPs would be mitigated or lessened as per 36 CFR 800.8 (c)(1)v. Is this addressed in the HPMP? If so, an SDEIS or Final EIS should say so as it does regarding other historic properties.

Page 3-508, line 18 – 24. Review of the HPMP every three years rather than every five years is acceptable to BLM as long as BLM is involved in the review process.

4.0 DEVELOPMENTAL ANALYSIS

Page 4-1, lines 16-17.

The Power Value Used in the DEIS is Overstated

Staff assumes 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 cites the applicant as the source¹ -- although PacifiCorp, itself, argues strongly that this price significantly overstates the value of marginal changes in Klamath generation.² In using these values, Staff has significantly exaggerated the true value of Klamath power; and, by implication, the value of the waterway for producing electric power relative to other uses. Indeed, applicant's Form 1 filings with FERC clearly demonstrate a history of purchasing power at substantially lower costs.

Specifically, the power value is to reflect the *least-cost* alternative to replacing the power from Klamath – the cost of providing *equivalent* power *but for* the Klamath Project. Instead, Staff has used a value which reflects the *highest-cost* of replacement with a *substantially more reliable* power (and therefore higher-valued power) than available from the Klamath Project. As will be

¹ DEIS, Section 4, Developmental Analysis, page 4-1.

² Opening Brief of PacifiCorp in U-901-E.

shown below, the *least-cost* of replacing Klamath power with *substantially more reliable* power is *no greater than 33 mills/kWh* average on-peak and off-peak, including a capacity rate, and may be as low as 1.2 mills/kWh. The extremely low reliability of Klamath generating capacity makes it difficult to value replacement with an *equivalently unreliable* source. Perhaps the best approximation would be to reduce the combined energy and capacity value for the more reliable power by 9.30 mills/kWh, the applicant's own estimate of the capacity cost filed in its most recent rate proceeding in Oregon.³ Thus the upper bound of the value of the Klamath power is 23.7 mills/kWh (33 mills/kWh – 9.3 mills/kWh) as an average on-peak and off-peak value.

Spot Prices Are Not A Proper Measure

Staff's reliance on spot prices in this proceeding is very unusual. Our review of all the environmental impact statements prepared by Staff in the Pacific Northwest and California over the last two years have failed to uncover any other instance in which Staff relied on a spot-market price. As suggested above, the question of replacement power is a question of what is the current cost of equivalent power *but for* the Project in question. This is equivalent to looking at the long-run supply curve to see the current cost of the next increment. A recent spot-price is a measure of the prior cost in a fixed-supply situation, assuming no increment to supply is available, and often for needs in excess of those anticipated. Essentially, it is the cost of power whose demand was either (1) not anticipated or (2) anticipated but the amount was so small that the cost of planning exceeded savings otherwise available. Accordingly, there is no reason to believe the spot-price will reflect what the next increment to supply will cost. Indeed, in a tight capacity market, spot prices may be expected to exceed the cost of the next increment to supply (a price signal that would call forth the additional supply); and in a market with excess capacity, spot price may reflect nothing more than marginal running (e.g., energy) costs. Indeed, a review of the PacifiCorp's annual Form 1 filing with FERC suggests their actual purchased power cost is lower than the measure they propose in this proceeding.

PacifiCorp appears to share our view of the impropriety of using spot market prices to value marginal changes in Klamath 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."⁴ Rather, PacifiCorp asserts that the value is "at best, reflected by PacifiCorp's decremental generation cost."⁵ We agree with PacifiCorp. That position, which is consistent with FERC Staff's long-standing objections to spot prices should be adopted in the revised analysis.

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, BPA is the largest wholesale supplier and publishes those prices. Indeed, BPA is commonly referenced by Staff as the source for replacement power in that region, and, therefore, the BPA rate as the basis for valuing that power.

BPA publishes two sets of rates – a "Priority Firm" (PF) rate intended for municipal utilities, irrigation districts and residential customers; and "New Resource" (NR) rate for all others. BPA rates are designed to fully recover all costs, and it is important to note that although the PF rate is

³ PacifiCorp Marginal Cost Study as filed in Oregon Docket UE-170, Table 5, and included in materials that the Department of the Interior has already filed in this proceeding.

⁴ Opening Brief of PacifiCorp in U-901-E, page 35.

⁵ *Ibid.*

substantially lower, it is a market rate and is not reflective of a subsidy. Indeed, rather than receiving any funding from general revenues, BPA makes payments to the treasury. Since PacifiCorp serves customers who would be eligible for a PF rate if they were to leave the system and establish a captive entity to provide the power, the value of replacement power from BPA is a weighted average of the PF and NR rate, with the weights based on the proportion of PacifiCorp's customers eligible for the PF rate. The Department of the Interior determined this value to be 37.67 mills/kWh⁶ as an average on-peak and off-peak value. Since that submission, BPA announced a general wholesale rate *cut* of 10 percent over the next 3 years.⁷ With the rate cut, the 37.67 mills/kWh becomes 33 mills/kWh, including a capacity rate.

However, as demonstrated below, Klamath is a highly unreliable source of power, and valuing it as high as the highly reliable power provided by BPA is clearly an overstatement of value of the Klamath Project as a source of power. Indeed, Klamath is certainly no more reliable a source than an interruptible power source. Since, conventionally, interruptible power is valued with no capacity charge, it is appropriate to further reduce the 33 mills/kWh by PacifiCorp's estimate of its marginal capacity cost of 9.3 mills/kWh, so that the upper bound of the value of Klamath power is 23.7 mills/kWh.

Improved System Efficiency May Obviate The Need For Klamath

Because the generation losses that may result from both the mandatory and recommended mitigation supported by the Department is *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 Klamath Project could be replaced by improved transformers, the value of the Klamath power is equal to the additional cost of upgrading to the more efficient transformers – estimated to be 1.2 mills/kWh⁸ as the *least-cost* option – this is the appropriate value for power losses associated with required mitigation, since such losses are less than total Klamath generation.

The Reliability of Klamath Power Is Exceptionally Low.

Klamath not only makes a *di minimus* contribution to the energy supply, what contribution it does make is extremely unreliable. PacifiCorp, itself, makes this point in filings in other forums. In February, 2005, PacifiCorp filed an application with the Oregon Public Utility Commission for accounting deferral relief due to consistently lower than expected hydro generation. Specifically, PacifiCorp stated in its application:

Over the past five years PacifiCorp has experienced hydro generation conditions far worse than those reflected in Oregon rates. Each year PacifiCorp has been forced to turn to market purchases or more expensive thermal generation to make up its hydro generation

⁶ Technical Memorandum Regarding Replacement Power Value, March 27, 2006, filed with the Department's preliminary terms, conditions, prescriptions, and recommendations for the Klamath Hydroelectric Project.

⁷ See, for example, report by EnergyCentral.com dated August 18, 2006.

⁸ Technical Memorandum Regarding Replacement Power Value, March 27, 2006

shortfall. As a result, since 2000, the Company has incurred increased power costs of almost \$600 million on a system wide basis and suffered financial harm.

In 2005, PacifiCorp appears to be facing its sixth consecutive year of a low hydro generation trend. If 2005 mirrors the conditions PacifiCorp has experienced over the last three years—and early indications are consistent with that Projection—PacifiCorp's actual hydro generation will be approximately 80 percent of that is reflected in rates. This will result in PacifiCorp incurring increased system power costs of approximately \$58 million.⁹

If actual generation can vary 20 percent or more below the minimum that the owner / operator and its regulator can reasonably anticipate for ratemaking purposes, it would certainly seem that the hydro units were a significantly less reliable source of electric power than the thermal generation or purchased power that have been consistently substituted for the unreliable hydro power.

PacifiCorp has not restricted its concerns regarding the reliability of its hydro generation to the Oregon Public Utility Commission. In its current rate application before the Public Utilities Commission of the State of California, PacifiCorp makes the following points:

- *Unpredictable* changes in flows caused by the Klamath Irrigation Project often result in spills, with no benefit to generation;¹⁰
- "...it is essential that the actual flow volatility be accurately accounted for in the hydropower value analysis."¹¹
- "Limitations on PacifiCorp's operational flexibility have become increasingly severe in recent years."¹²
- "Likewise, in response to an unpredictable decrease in flow, PacifiCorp must *typically* decrease hydro generation and *increase generation from other sources*. [Emphasis added].¹³

Moreover, PacifiCorp's own analysis in its Integrated Resource Plan (IRP) demonstrates that their concerns regarding the unreliability of the Klamath operations in particular have substantial merit. In its recent capacity expansion model (CEM) runs, PacifiCorp added two scenarios. "SAS12, Replace a baseload pulverized resource with carbon-capture-ready IGCC" was added as part of "Alternative Futures Scenario #11 ('Medium Load Growth')" and "SAS16, Replace Klamath hydro units with alternative resources" was added as part of PacifiCorp's "Preferred Portfolio."¹⁴

The model results are summarized on slide 21, with details by resource type on slides 22 through 27. SAS12 had a Present Value Revenue Requirement (PVRR) of \$24.3 billion for resource additions ranging from 85.1 mW in 2007 to 3558 mW in 2016. By contrast, SAS16, the scenario to replace the Klamath units, did not report a need for any resource additions.¹⁵ One reasonable explanation lies in the nature of a CEM's orientation to capacity and reliability, and maintaining

⁹ "Application of PACIFICORP for an Order Approving Deferral of Costs Related to Declining Hydro Generation", filed with the Public Utility Commission of Oregon, February 1, 2005, page 1.

¹⁰ Opening Brief of PacifiCorp in U-901-E, page 29.

¹¹ *Ibid*, page 31.

¹² *Ibid*.

¹³ *Ibid*, page 33.

¹⁴ "2006 Integrated Resource Plan Capacity Expansion Module (CEM) Results", slide 5. The full report is accessible from the internet at <http://www.pacificorp.com/File/File67453.pdf>.

¹⁵ A note in the tables reports that there are no results shown for SAS04 and SAS05, two other scenarios, because the model runs were not yet available. No such explanation was provided for SAS16.

a specified joint (system wide) unplanned outage probability (e.g., one day in 10 years). That is, since Klamath is both very small and highly unreliable, its loss to the system does not negatively impact overall system reliability or capacity. In short, the PacifiCorp's CEM appears to have ignored the "loss" of Klamath.

Page 4-2, Table 4-3.

Lack of Documentation

Documentation is not provided for the summary statistics in this table. We asked FERC Staff for their working papers and studies upon which they relied.¹⁶ 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, FERC refused to provide any information, citing agency practice.¹⁷

"Net Benefits" Are Really "Gross Profits"

Rather than being an assessment of the Project's impacts on the environment and the mitigation necessary to address the adverse environmental impacts, the Table 4-3 is an analysis only of the effect of the 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 the applicant's cost of production under certain circumstances, it is nothing more than "Gross Profit." Although "Gross Profits," using the IRS definition (which is computationally the same as the FERC 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. FERC'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, the applicant. 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, FERC Staff's 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 (which appears to have been the case of Klamath), and in fact does not provide an adequate basis for decision making.

Certainly, the proposed 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 FERC's 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 hydro Project. The appropriate conclusion to draw from Table 4-3, if properly calculated, is that the environmental damage resulting from

¹⁶ See letter from Steve Thompson, Manager, California/Nevada Operations, U.S. Fish and Wildlife Service, October 6, 2006.

¹⁷ See letter from Timothy J. Welch, Chief, Hydro West Branch 2, November 9, 2006.

Klamath 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.

None of the entries in the table address, in any way, the uncompensated consumption and destruction of the resources that is (or should be) the subject of the environmental impact statement for the relicensing of the Klamath hydroelectric Project. Although we certainly are not suggesting that it is necessary to place a monetary value on the resource losses, we do believe that one cannot make an "informed decision" in the absence of a quantitative estimate of the resource consequences, albeit in a different metric from the gross profitability calculation.

Page 4-4, line 27. The Commission should disclose the methodology, assumptions, and complete results of the "independent conceptual evaluation of the potential costs" of dam removal in the SDEIS, and also include other estimates available in the record.

5.0 STAFF CONCLUSIONS

Staff Conclusions – Flushing Flows and Gravel Management

Page 5-1, lines 27 and 28. Measure 1P requires implementation of instream flows and ramp rates in Project reaches to protect and/or enhance flow dependent resources. Specific flows and ramp rates that accomplish these goals should be identified with sufficient analysis to support them.

Page 5-1, lines 29 – 42 and page 5-2, lines 1 - 3. Measures 2P and 3P should require similar provisions at Copco No. 1 dam.

Page 5-6, lines 35 and 36. The monitoring plan for *Microcystis aeruginosa* should include *in situ* studies on the impacts of toxins from *M. aeruginosa* (microcystins) on fish and other aquatic biota of the Klamath River. Monitoring and impact studies should be conducted within and between Copco and Iron Gate reservoirs and extend downstream of Iron Gate dam as far as elevated toxin or algae levels have been detected by prior studies. Impacts of *Microcystis sp.* and the toxin it produces in fish and other aquatic biota should be studies.

Page 5-19, lines 18-22. FERC implies that flushing of fine sediments from redds is the primary reason for seasonal high flow prescription, with only a superficial mention of other benefits such as increasing channel complexity. The full scope of expected benefits of the seasonal high flow prescriptions should be disclosed here.

Page 5-19, lines 27-33: FERC does not compare frequency, duration, and timing of high flows under existing or proposed flows with that which would occur under the BLM prescribed flow (See BLM modeled flow for the period of record 1960-2004.) These comparisons were made in the Department's filing of preliminary prescriptions and mandatory conditions. These analyses should be included in revising the DEIS.

Page 5-19, lines 34-36: FERC concludes that water in the Copco 2 bypass reach would be too warm to support resident trout. Please consider the technical memorandum filed with these comments (Gard 2006) which demonstrate temperature tolerance and added growth potential given higher water temperatures and higher nutrient levels.

Page 5-19-5-20. Please consider the following finding of the ALJ and the underlying data and analysis behind the factual finding when revising the DEIS. “Seasonal high flows, in combination with the BLM’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” (ALJ Decision at 38, FOF 10-5).

Staff Conclusions – Project Operation Management

Page 5-23, lines 32-36: Reclamation believes there should be more gauging within the PacifiCorp Project to allow full disclosure of Project operations that affect multiple parties.

Page 5-24, lines 20-40: Reclamation agrees that they should be a party to development of an operations and resources management plan for the PacifiCorp Project. However, there should be additional gauging within that Project and that the output of that gauging should be made available to the public in real time.

Staff Conclusions – Instream Flows

Page 5-35, lines 14-15: This statement is incorrect. The large daily fluctuations experienced between Link River Dam and Keno Dam are due to PacifiCorp’s daily peaking operations of the Eastside and Westside power plants. The large daily fluctuation will no longer occur when those power plants go off line. The large daily fluctuations at the USGS Link River gage can be seen in the attached spreadsheet (column G) along with the net change in agricultural diversions (column N).

Staff Conclusions – Anadromous Fish Restoration

Page 5-36, line 32. PacifiCorp relied heavily on the Miller Radio-Telemetry study (Miller et al. 2004) to support its position that predation of juvenile anadromous fish in reservoirs would be significant. FERC staff did not consider that the record shows and the ALJ found that the Miller Radio-Telemetry study is not scientifically reliable, and that it should be accorded little, if any, weight (ALJ Decision at 86, UFOF 1). In coming to this conclusion, the ALJ noted that the study was based on a small sample of juvenile salmonids, it used hatchery fish which lack the predator avoidance skills of wild fish, and the authors themselves admitted that fish passage success and travel time may be underestimated. Further, the ALJ noted that the study: 1) lacked a control group; 2) was conducted during one-water year type and so it does not represent the normal range of flow conditions; 3) was conducted with highly variable peaking flows; and 4) produced widely varying results between 18 and 100 percent survival for different groups of salmonids in one reservoir (ALJ Decision at 56-57).¹⁸

Staff Conclusions – Fish Disease Management

Page 5-38, lines 10 and 43. The Disease Management Section is numbered 3.3.3.2.3, not 3.3.3.2.5.

¹⁸ Approximately 40 percent of the test fish successfully migrated through the reservoirs. Given the conditions of the study, the Services interpret this as strong evidence that Iron Gate and Copco 1 reservoirs, which are narrow and have short hydraulic residence periods, will not significantly impede migration or mortality.

Staff Conclusions –Aquatic Resources Monitoring

Page 5-45. The DEIS in Section 5.2.1.1 concludes that all available information indicates that the trout fisheries in the Keno and J.C. Boyle peaking and bypassed reaches are in good condition, and proposed operations would not adversely affect these fisheries, therefore monitoring of riverine fish populations and monitoring of fish movement is not justified as recommended by FWS and ODFW. In contrast, 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 (ALJ Decision at 26, FOF 3-6); the Project restricts migration of resident fish within the mainstem and into and out of the tributaries (ALJ Decision at 27, FOF 3-8), including highly spawning and rearing habitat in Spencer Creek (ALJ Decision at 27, FOF 3-13); that the lack of fishways at Iron Gate, Copco I, and Copco II dams block all upstream passage, isolating resident fish from counterparts below the dams (ALJ Decision at 27, FOF 3-8); and the Projects limitation on riverine migration may have reduced the genetic diversity of the remaining stocks within the Project reaches (ALJ Decision at 28, FOF 3-16). Thus, FERC’s conclusions should be revised.

Page 5-50. Recreational Resource Management. We support FERC’s analysis to include the Recreation Resource Management Plan and its elements. We also agree with FERC’s analysis that Topsy Campground is a Project-related facility, and that PacifiCorp should therefore share in the responsibility for the campground’s operation and maintenance.

Page 5-58. As noted here, the California State Coastal Conservancy has conducted studies of the Project reservoir sediments. This study has recently been completed and indicates that the toxicity of the sediments in the Project’s reservoirs is very low and will not affect the method or cost of any dam decommissioning (California Coastal Conservancy 2006). Accordingly, the SDEIS in Section 5.2.21 and elsewhere must be revised to reflect these findings.

Staff Conclusions - Terrestrial Resources

Again this section is confusing and lacks focus. Summaries of stakeholder conditions and proposals does little to elucidate the “staff’s conclusions” and, to the contrary, makes it more difficult to determine what PacifiCorp is proposing. In either case, it is not clear how this relates to the staff’s conclusions on environmental effects.

Page 5-47, line 16-18. PacifiCorp proposes to limit the vegetation management plan, including the noxious weed management plan, to areas needed for Project operations and within the Project boundary. However, other landowners are required by state and county laws and regulations to manage noxious weeds on all their lands. It is not really clear why PacifiCorp thinks that it should be exempt from these requirements.

Page 5-48, line 5-9. Again, PacifiCorp proposes focusing its noxious weed activities only within the “Project boundary” which avoids its landowner responsibilities and violated the principles on integrated noxious weed management. The effects and cumulative effects of limiting weed management to only a portion of their ownership should be analyzed and disclosed.

Staff Conclusions - Cultural Resources

Page 5-53, line 4-5. The revised (March 2006) HPMP does not include sites located within the APE on BLM land.

Page 5-53, line 34-36. FERC indicates that the areas requiring survey on BLM land within the APE should be inspected. In this Staff summary, nothing is said regarding elimination of survey units A, C, E, H, I, J and K.

Page 5-53, line 44-47. FERC indicates that PacifiCorp should revise its HPMP to reflect the geographic area of historic property management for the Project as determined by the Commission. Thus, BLM sites within the APE should be included in the next revision of the HPMP.

Page 5-80, line 25. FERC agrees that PacifiCorp should complete cultural resource surveys of the 77.2 acres identified by BLM as long as those surveys are restricted “to the limits of Project capacity along the peaking reach and areas in the vicinity of Big Bend that may be subject to disturbance by proposed recreational facilities. Protocols for addressing cultural resources would be specified in the final HPMP for the entire APE, which would include Bureau-administered land, as appropriate.”

Page 5-80, line 26. FERC agrees that the HPMP should be amended to include BLM sites although they propose to “restrict PacifiCorp’s responsibilities to sites within the APE that are influenced by Project operations.”

Page 5-83: The LRP is listed incorrectly under the plans of the State of California on page 5-83. The appropriate place to list this plan is under the plans of the United States.

Page 5-91, line 6: The reach as not designated by Congress, but by the Secretary of the Interior, at the request of the Governor of Oregon, pursuant to Section 2(a)(ii) of the WSRA.

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