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PACIFICORP ENERGY
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December 30, 2011

VIA EMAIL AND OVERNIGHT MAIL

Ms. Elizabeth Vasquez
Bureau of Reclamation
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Sacramento, CA 95825
Email: evasquez@usbr.gov; KlamathSD@usbr.gov

Mr. Gordon Leppig
California Department of Fish and Game
619 Second Street
Eureka, CA 95501
Email: gleppig@dfg.ca.gov; KSDcomments@dfg.ca.gov

Re: PacifiCorp Comments on the Draft Environmental Impact Statement/Environmental Impact Report for Klamath Facilities Removal

Dear Ms. Vasquez and Mr. Leppig:

Through this letter, PacifiCorp Energy ("PacifiCorp") transmits its preliminary comments on the Klamath Facilities Removal Public Draft Environmental Impact Statement/Environmental Impact Report ("Draft EIS/EIR") (State Clearinghouse # 2010062060) published by the U.S. Department of the Interior ("Interior") and the California Department of Fish and Game ("CDFG") on September 22, 2011 (76 Fed. Reg. 58833). PacifiCorp reserves its right to supplement these preliminary comments in the future during any additional public comment periods, and prior to issuance of final agency decisions in this proceeding.

By way of background, PacifiCorp owns and operates the Klamath Hydroelectric Project ("the Project"), which includes four hydroelectric dams on the Klamath River that may be removed pursuant to the terms and conditions of the Klamath Hydroelectric Settlement Agreement ("KHSA"). PacifiCorp entered into the KHSA to resolve issues related to the relicensing of the Project, a process that began over a decade ago.

PacifiCorp supports the KHSA and believes that successful implementation of the KHSA represents an acceptable outcome for resolving the relicensing process for the Company and its approximately 1.7 million customers across six western states. PacifiCorp entered

Comment 1 - Approves of Dam Removal

into the KHSA based upon an assessment that the KHSA provides superior cost and risk certainty for its customers as compared to the less certain path of continuing the relicensing of the Project. This assessment has been affirmed by the public utility commissions in California and Oregon through their orders approving dam removal surcharges consistent with the KHSA for PacifiCorp's customers in those states.[1]

As a result of PacifiCorp's long involvement in the Klamath basin as the operator of Klamath River dams, PacifiCorp has developed an extensive scientific record concerning the effects of the Project on Klamath basin resources. This scientific record is relevant to many of the issues and analyses contained in the Draft EIS/EIR. PacifiCorp hereby incorporates directly these analyses in our comments on the Draft EIS/EIR, as referenced in the attached documents.

PacifiCorp offers the attached comments to inform and improve the environmental analysis contained in the Draft EIS/EIR. Please feel free to contact me at (503) 813-6170 should you have any questions regarding these comments.

Sincerely,

Tim Hemstreet

Tim Hemstreet
Klamath Project Manager

Enclosure

[1] The California PUC order can be found at: http://docs.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/134812.htm. The Oregon PUC order can be found at http://apps.puc.state.or.us/orders/2010ords/10-364.pdf.

Comments on the Public Draft of the Klamath Facilities Removal Draft Environmental Impact Statement/Environmental Impact Report

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This document summarizes key comments, observations, and corrections from PacifiCorp on the Public Draft of the Klamath Facilities Removal Environmental Impact Statement/Environmental Impact Report (hereafter, "the Draft EIS/EIR"), issued on September 21, 2011 by the Department of the Interior (Interior), in association with the California Department of Fish and Game (CDFG). The Draft EIS/EIR evaluates the potential impacts of the removal of four PacifiCorp dams – J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate – on the Klamath River as contemplated in the Klamath Hydroelectric Settlement Agreement (KHSA), as well as the impacts associated with implementation of restoration activities contemplated under the Klamath Basin Restoration Agreement (KBRA), activities which are intended to complement dam removal through specific actions including, but not limited to, improvements in water quality, river flows, and restoration of fish habitat. Specifically, the KHSA established a process for studies, environmental review, and a decision by the Secretary of the Interior regarding whether removal of PacifiCorp's four main stem Klamath River hydroelectric dams: (1) will advance restoration of anadromous fish in the Klamath Basin; and (2) is in the public interest.[1]

The Draft EIS/EIR represents a significant effort on the part of Interior and CDFG, with assistance from the Department of Commerce (Commerce), to study and evaluate a complex Proposed Action and other action alternatives, that, if implemented, will have notable effects across the Klamath basin, through actions including potential dam removal as well as implementation of activities and programs pursuant to the KBRA. PacifiCorp recognizes Interior, Commerce, and CDFG, for their expeditious completion of the Draft EIS/EIR and commitment to advancing the Klamath Settlements through this process.

Key comments from PacifiCorp on the Draft EIS/EIR are summarized below. Attached to this summary document is a detailed table of comments on the Draft EIS/EIR (by section and page number). The table also includes comments on selected appendices and technical reports issued with the Draft EIS/EIR. Given the volume, scope and complexity of the technical information contained in the Draft EIS/EIR, mistakes and inconsistencies are to be expected in this draft document. PacifiCorp offers these comments to improve the analysis in the Draft EIS/EIR and the alternatives and mitigation considered.

Comment 2- NEPA/CEQA

Key Comments on the Draft EIS/EIR

1. The Draft EIS/EIR does not, in many instances, properly account for the benefits of Interim Measures and other actions currently being funded or implemented by PacifiCorp pursuant to

[1] PacifiCorp notes that the Draft EIS/EIR, and the alternatives it includes, have been developed solely for the purpose of analyzing the environmental consequences of implementing the KHSA and connected actions from the KBRA, and to inform the determination by the Secretary of the Interior whether to proceed with dam removal pursuant to the KHSA, including an assumption that the KBRA would be fully implemented as well.

Comment 2 cont.

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Comment 3 - General/Other

the KHSA and other regulatory processes. For instance, the analysis of Interim Measure 3, Iron Gate Turbine Venting, does not take into account recent PacifiCorp data on the effects of this interim measure (PacifiCorp 2008, 2011b). Also, the Draft EIS/EIR analysis does not consider activities under Interim Measure 2, Coho Enhancement Fund (PacifiCorp 2011a).

2. The Draft EIS/EIR overstates, in some place significantly, the effects of the Klamath Hydroelectric Project (Project) on various resource areas and issues including hydrology, water quality and temperature, aquatic resources, fish disease, cultural resources, and algae, among others. In addition, the stated effects of the Project described in the Draft EIS/EIR are, at times, not consistent with the literature cited and utilized by the document, at times misstating the conclusions of this cited research. This should be corrected in a Final EIS/EIR.

3. The Proposed Action described in the Draft EIS/EIR consists of removal of PacifiCorp's four Klamath River hydroelectric dams and implementation of the KBRA as a connected action. However, the Draft EIS/EIR does not consistently include or describe implementation of KBRA activities and programs as key elements of the Proposed Action, often describing the Proposed Action simply as "dam removal". This is often confusing in the document as benefits of the Proposed Action are often described that are not attributable to dam removal alone. The Draft EIS/EIR should be corrected to consistently describe the Proposed Action as dam removal and implementation of the KBRA.

Comment 4 - Proposed Action/Project

4. The analyses of effects in the Draft EIS/EIR for the No Action Alternative and other alternatives explicitly incorporates highly uncertain TMDL scenarios and modeling results that contain substantial flaws, which PacifiCorp has documented previously in its comments on the TMDL. In addition, the Draft EIS/EIR assumes that TMDLs are reasonably certain to be achieved. There have been substantial technical critiques of these TMDLs, including information indicating the TMDLs are unrealistic and unattainable. Independent assessments of conditions for anadromous fish in the Klamath Basin by the National Research Council (NRC 2004, NRC 2008) and the Klamath River Expert Panels (Dunne et al. 2011, Goodman et al. 2011), although not referring to the TMDLs specifically, indicate that very substantial water quality improvements in the Klamath Basin, such as assumed in the TMDLs, are unrealistic or at best highly uncertain. Notwithstanding PacifiCorp's support for the KHSA, PacifiCorp does not intend to waive and expressly preserves its challenge to the TMDL and TMDL models, and preserves its rights to challenge TMDL implementation plan measures, and conclusions regarding the Project's purported effects on water quality in other proceedings. PacifiCorp's TMDL comments are incorporated by reference and can be made available upon request. Furthermore, PacifiCorp does not endorse nor agree with representations made in the Draft EIS/EIR regarding the ability of the Project to achieve water quality objectives as may be applicable in other regulatory proceedings.

5. The Draft EIS/EIR relies upon fish production modeling (Hendrix 2011) based upon an approach that does not consider certain critical factors relevant to fish production in the Klamath basin including water quality and fish disease, among others. PacifiCorp notes that the fish production modeling by Hendrix (2011) yields highly uncertain results, even as it does not consider critical factors like water quality and fish disease that, if included, would yield results with even greater uncertainty. Additionally, the fish production modeling does not explicitly account for improvements to habitat qualities that are already occurring as a result of basin restoration activities currently underway.

Comment 6 - Fish

Comment 5 - Water Quality

Comment 7 - Envr. Justice

6. The Draft EIS/EIR contains numerous incorrect statements or claims related to potential effects of the Project, particularly in the Tribal Trust and Environmental Justice chapters, that are not supported by analysis presented in the document. The Draft EIS/EIR should correct these statements so that they are consistent with the analyses and conclusions contained elsewhere in the document within chapters analyzing specific resource areas.

7. The Draft EIS/EIR's analysis of Project effects on fisheries fails to provide supporting data or citations for many stated conclusions (as noted in PacifiCorp's attached detailed table of comments).

PacifiCorp's detailed comments on the Draft EIS/EIR are included in the following table.

Comment 8 - Fish

REFERENCES

Dunne, T., G. Ruggerone, D. Goodman, K. Rose, W. Kimmerer, and J. Ebersole. 2011. Klamath River Expert Panel. Final Report. Scientific Assessment of Two Dam Removal Alternatives on Coho Salmon and Steelhead. April 25, 2011.

Goodman, D., M. Harvey, R. Hughes, W. Kimmerer, K. Rose, and G. Ruggerone. 2011. Klamath River Expert Panel. Addendum to Final Report. Scientific Assessment of Two Dam Removal Alternatives on Chinook Salmon. July 20, 2011.

Hendrix, N. 2011. Forecasting the response of Klamath Basin Chinook populations to dam removal and restoration of anadromy versus no action. Review Draft Report. R2 Resource Consultants, Redmond, Washington.

National Research Council (NRC). 2004. Endangered and threatened fishes in the Klamath River Basin: causes of decline and strategies for recovery. The National Academies Press, Washington, DC. 397 p.

National Research Council (NRC). 2008. Hydrology, ecology, and fishes of the Klamath River Basin. Washington, DC: The National Academies Press. 249 pp.

PacifiCorp. 2008. 2008 Iron Gate Turbine Venting Study of Dissolved Oxygen Improvement. Summary Report. December 12, 2008.

PacifiCorp. 2011a. PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan for Coho Salmon. Prepared by PacifiCorp Energy, Inc, Portland, OR. Submitted to the National Marine Fisheries Service, Arcata Area Office, Arcata, CA. March 2011.

PacifiCorp. 2011b. Results of 2010 Turbine Venting Tests to Improve Dissolved Oxygen below Iron Gate Dam. Technical Memorandum. Prepared by PacifiCorp Energy, Inc, Portland, OR. September 2011. Available at http://www.pacificorp.com/es/hydro/hl/kr.html#.

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Num.	Document Section Number	Page Number	Paragraph or Line Number	Figure or Table Number	Comment
1	ES.2.1	ES-7			Comment 9 - Recreation Recreation should be in the list of conditions/resources that have been affected by the activities in the timeline. This comment applies throughout the document.
2	ES.2.2	ES-9		Figure ES-2a	The timeline does not mention the proposed Salt Caves Project for the Hells Corner reach, which was the impetus for the 1993 Wild and Scenic River (WSR) designation. Protecting whitewater boating opportunities was the reason for that designation.
3	ES.6.1	ES-21			Comment 10 - Water Quality The document states that TMDL "implementation mechanisms, funding, and timing are currently unknown". The document does not define what TMDL objectives, if any, are necessary to be achieved, and in what time frame, in order to realize anticipated fisheries improvements for each alternative.
4	ES.7	ES-30		Table ES-4	Comment 11 - Alternatives Trap and Haul operations at Keno dam, although identified as a component of Alternative 2 in Chapter 2 (see page 2-45), is not consistently included in Table ES-4 for Alternative 2. This should be updated in the Final EIS/EIR, which should also discuss the trap and haul activities related to Alternative 2, at a level of detail consistent with the discussion of this topic in Alternative 4 (as discussed in Chapter 2, p. 2-83).
5	ES.7	ES-30		Table ES-4	Comment 12 - Algae Footnote 9 of Table ES-4 states that Copco 1 and Iron Gate reservoirs are responsible for the production of algal toxins, such as microcystin, in the Klamath River downstream of Iron Gate Dam. This is not correct, as algal toxins (including microcystin) have been documented upstream of the hydroelectric projects in Upper Klamath Lake. Algae (including those that produce algal toxins) may be produced wherever conditions are suitable for its growth, and there is no data to support the conclusion that algal toxins in the lower river only occur due to the presence of Iron Gate and Copco reservoirs. The Final EIS/EIR should be revised to acknowledge this.
6	ES.7.3	ES-47		Table ES-7	The changes in types and amounts of whitewater boating between Alternative 1 and other alternatives should be in the list of controversial actions. The no action alternative has peaking regimes in mid to late summer that support a substantial commercial outfitting industry. This would be reduced and possibly eliminated by a once-a-week peaking (Alternative 4), the run-of-river regime (Alternative 5) or the full and partial facility removal alternative (Alternatives 2 and 3). While additional whitewater opportunities would become available with dam and reservoir removal, the local economic impacts and loss of specific, well-known challenging whitewater, and the substantial changes in the outfitting industry, will have a large enough impact to specific communities of boaters that it deserves attention as a "controversial action." Comment 13 - Recreation

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Num.	Document Section Number	Page Number	Paragraph or Line Number	Figure or Table Number	Comment
7	1.1.3.2	1-7	1st bullet	Text box	The Draft EIS/EIR states "The four dams create water temperature in the river that are too warm in the fall for fish migration, and they affect the natural flow variability in the lower river and cause crowding of salmon below Iron Gate Dam, both of which contribute to fish disease." This statement that the dams "create water temperatures in the river that are too warm in the fall for fish migration" is not correct and is unsupported in the Draft EIS/EIR. Available temperature data and water quality modeling studies indicate that temperature conditions for fish migration in most of the lower Klamath River are unaffected by the dams. Modeling indicates that temperature effects are generally absent in the lower 120 miles of the river. Also, water temperatures in the fall are undergoing relatively rapid seasonal cooling, so that even the upper portion of the river affected by the dams has water temperature conditions that are suitable for fish migration, particularly after September when most migration occurs. As discussed in PacifiCorp's comments on the Klamath River TMDL, existing river temperature conditions below Iron Gate dam support a balanced indigenous population of fish and apparently do not hinder the migration of fish to the hatchery fish ladder at the base of Iron Gate dam, the fish hatchery facility downstream of the dam, or to other Klamath basin tributaries such as Bogus Creek, which would be most affected by temperature conditions resulting from Iron Gate dam. This statement that the dams "affect the natural flow variability in the lower river and cause crowding of salmon below Iron Gate Dam, both of which contribute to fish disease" also is not correct and is unsupported in the Draft EIS/EIR. As thoroughly discussed in PacifiCorp's Water Resources Technical Report (PacifiCorp 2004b) and the FERC (2007) Final EIS (on PacifiCorp's 2004 License Application), the Klamath facilities have only minor effects on flow variability in the lower river due to their minimal storage capacity. Flow variability in the lower river is much more significantly affected by Reclamation's flow management at Upper Klamath Lake (via Link River dam). The Draft EIS/EIR should clarify this point. On the matter of crowding and disease causation, the Draft EIS/EIR should discuss that uncertainty about these aspects is very high, as has been pointed out by the Klamath River Expert Panel on Chinook Salmon. The Draft EIS/EIR should define "crowding" and what metric is being used to describe crowding. The number of salmon per river mile or area varies between the mainstem Klamath River below Iron Gate dam and what occurs in tributaries (e.g., Bogus Creek). The Draft EIS/EIR should discuss how metrics used to determine "crowding" were developed and whether these metrics were compared to other salmon-bearing streams in California and/or the Pacific Northwest, especially stream reaches that include the presence of a fish hatchery such as exists below Iron Gate dam. Also, as reported by Bartholomew (2009), the main nidus of disease infection in the river downstream of Iron Gate dam is near Beaver Creek, which is nearly 30 miles downstream.
8	1.1.3.4	1-7		Text box, second	The Draft EIS/EIR states "Severe water quality problems in these four reservoirs, including blue-green algal toxins (that can affect humans and fish), low dissolved oxygen, high temperatures, and high pH,

Comment 14 - Water Quality

Comment 15 - Algae

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				bullet	create stressful biological conditions." This statement is not correct. The Draft EIS/EIR should clarify that blue-green algal toxins are generally not present in J.C. Boyle reservoir, or in Copco 2 reservoir. Both J.C. Boyle and Copco 2 reservoirs are relatively small, fast-flushing impoundments in which water quality conditions reflect the water quality of inflowing waters. Extensive modeling and monitoring of water quality in the upper Klamath River indicate that dissolved oxygen, temperature, and pH in these smaller reservoirs is mainly determined by the conditions or loads that enter from upstream (for example, see PacifiCorp's [2004b] Water Resources Technical Report). Also, large blooms of *Microcystis aeruginosa* and associated algal toxins from such blooms have not been recorded in these smaller reservoirs. In fact, the above statement in the Draft EIS/EIR should be corrected to alleviate inconsistent statements made elsewhere in the Draft EIS/EIR related to the water quality effects of the smaller reservoirs. For example, on page 2-83, the Draft EIS/EIR states that the two-dam removal alternative (Alternative 5) "would also address water quality problems driven by reservoir size, such as increased water temperature, low dissolved oxygen, and toxic algal blooms in the summer and fall". Also, on page 3.2-29 (last paragraph), the Draft EIS/EIR describes that large populations of algae occur in Upper Klamath Lake and Keno reservoir, but do not persist in J.C. Boyle reservoir, and that algae levels in the two larger downstream reservoirs (Copco 1 and Iron Gate reservoirs) are significantly elevated compared to the mainstem river, although not as high as found in Upper Klamath Lake and Keno reservoir.
9	1.1.3.4	1-8	4th para.		The statement should indicate that Copco 1 dam was the first "permanent" dam to block fish passage to the upper basin. The Klamathon Dam, which was located below present-day Iron Gate Dam, blocked fish passage between 1889 and 1902, after which the dam was destroyed. Fish passage to the upper basin was then curtailed in 1910 at the same site when the US Bureau of Fisheries installed a fish collection rack at Klamathon.
10	1.2.6.1	1-16	Last para.		The primary purpose of the PacifiCorp project is obviously hydropower generation. However, it also provides other benefits that include mid to late summer whitewater boating on the Hells Corner Reach and recreation at several reservoirs and associated facilities.
11	1.4.1	1-29		Table 1-2	The table does not include the Bureau of Land Management as a cooperating agency. If this is not correct, which would seem so, then this should be addressed.
12	1.4.2.1	1-29	Last para.		The Proposed Action here lists only removal of four mainstem PacifiCorp dams. Here, as elsewhere in the Draft EIS/EIR, the Proposed Action should consistently include implementation of KBRA activities as well as KBRA programs and activities are key elements of the Proposed Action.

Comment 15 cont.

Comment 16 - Fish

Comment 17 - Recreation

Comment 18 - NEPA

Comment 19 - Proposed Action/ Project

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Num.	Document Section Number	Page Number	Paragraph or Line Number	Figure or Table Number	Comment
13	2.1	2-1			Comment 20 - Alternatives The analyses in Chapter 3 are sometimes inconsistent across alternatives. For example, similar temperature changes are referred to as minor in some alternatives but are characterized as significant or a problem in other alternatives. The Final EIS/EIR should provide a more consistent description of impacts across the alternatives.
14	2.4.2	2-13	1st para.		Comment 21 - Fish The analysis of Aquatics in Chapter 3 does not include implementation of the NOAA's Coho Recovery Plan, the effects of continued expenditures of $10-20 million a year on various Basin-wide restoration projects (e.g., stream habitat improvements), and other basin conservation plans. These measures should be included in the Chapter 3 analysis. For example, the habitat enhancement activities under PacifiCorp's HCP (PacifiCorp 2011a) will result in long-term improved habitat conditions and access to habitat that will be targeted to benefit coho salmon, but will benefit Chinook salmon and steelhead as well.
15	2.4.2	2-14	1st bullet		Comment 22 - Alternatives The Draft EIS/EIR states that the No Action Alternative includes the Williamson River Delta Project, which includes levee breaching that provides 28,800 acre-feet of additional storage in Upper Klamath Lake and restoration of habitat at the delta. The Final EIS/EIR should explain how this storage is used, and the impacts of this measure on aquatic resources.
16	2.4.2	2-14	3rd bullet		Comment 23 - Fish The Draft EIS/EIR states that Fish Habitat Restoration activities are ongoing throughout the basin under current authorities and funding levels. The analysis of aquatic resources under the No Action Alternative should provide an explanation of the benefits of these measures. The Williamson River delta levees were breached in October 2007, not November 2008.
17	2.4.2	2-14 to 2-15		Table 2-6	Comment 24a - Alternatives The Draft EIS/EIR states that Interim Measures (IM) 2, 3, 4, 5, 6, 7, 8, 13, 14 and 17 from the KHSA are included in the No Action/No Project alternative. The Water Quality analysis in Chapter 3 discusses only IMs 3, 7, and 8 under the No Action alternative. The Aquatics Resources (Fisheries) analysis in Chapter 3 discusses only IMs 3, 7, and 8 under the No Action alternative. The omitted IMs should be included in the No Action Alternative in Chapter 3. Regarding IM 3 (Turbine Venting), the discussion in Chapter 3 should include more recent data developed by PacifiCorp in 2011 (see PacifiCorp 2011b), and this interim measure should be included in Table 2-6. Regarding IM 8 – J.C. Boyle Bypass Barrier Removal, this IM should not be included in the No Action alternative since implementation of this IM is to occur following the Secretarial Determination, and thus should be considered a component of the Proposed Action.
18	2.4.2	2-16	3rd para.		Comment 25 - Hydrology The Draft EIS/EIR states that the No Action/No Project alternative assumes "Flows would remain the similar to current flows". However, adjustments in flow operations are occurring as a result of

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					implementation of IM 5 (Iron Gate Flow Variability), which is being implemented in conjunction with requirements for flow variability included in the latest Biological Opinion for Reclamation's Klamath Project (NMFS 2010). This statement should be corrected in the Final EIS/EIR.
19	2.4.2	2-17	Second three bullets		Implementation of IM 5 (Iron Gate Flow Variability) should be included as well as ramp rates in this list of bullets. PacifiCorp currently coordinates with Reclamation on the implementation of a flow variability program at Iron Gate dam consistent with IM 5.
20	2.4.2	2-18	Last para.		The Draft EIS/EIR states "The TMDLs within the basin are expected to result in improvements to water quality conditions, but the improvements cannot be quantified due to uncertainties regarding the timing and magnitude of mitigation projects, necessary to achieve water quality standards". PacifiCorp notes that the substantial uncertainty regarding TMDL water quality improvements may affect decisions related to the effects of the alternatives.
21	2.4.3	2-19	1st para.		The first sentence of this page provides an incomplete description of the Proposed Action. The Proposed Action includes the entirety of the KBRA programs and actions as a connected action. This description should be revised throughout the Final EIS/EIR.
22	2.4.3	2-20 and 2-21		Table 2-10	The Draft EIS/EIR states that Interim Measures 7, 11, 16, 19 and 20 from the KHSA are included in the Proposed Action alternative. However, the Water Quality analysis in Chapter 3 (Proposed Action Alternative) discusses only IMs 7 and 16. The Aquatics Resources (Fisheries) analysis in Chapter 3 (Proposed Action) also only discusses only IMs 7 and 16. A discussion of other IMs should be added.
23	2.4.3.1	2-22		Table 2-10, Note 1	Table Note 1 implies that PacifiCorp will provide funding for the Fish Reintroduction Plan under the KBRA. It should be clarified that PacifiCorp's funding requirements are limited to measures and activities contained within the KHSA.
24	2.4.3.7	2-36	2nd para.		The document states "Prior to the transfer, PacifiCorp would complete any necessary improvements to the facility in order to meet DOI Directives and Standards for dam safety." This conflicts with KHSA 7.5.2, which says that any improvements to meet these requirements will be funded from sources other than PacifiCorp. The Final EIS/EIR should clarify the current status of any needed improvements and, if any are necessary, how they may be funded.
25	2.4.3.7	2-36			This section should be updated with a discussion of how Keno's flows would be managed following potential facilities removal. The presence of anadromous fish and position of Keno as the most downstream dam following potential removal may require changes to operation of the facility as compared to historic practice. The Final EIS/EIR should clarify assumptions regarding future Keno

Comment 25 cont.

Comment 26 - Water Quality

Comment 27 - Proposed Project/Action

Comment 24b - Alternatives

Comment 28 - KHSA

Comment 29 - KHSA

Comment 30 - Keno Transfer

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					operations, which should be consistent with assumptions regarding minimum flows and ramp rates that were used to develop the hydrology modeling referenced later in the Draft EIS/EIR.
26	2.4.5.5	2-83			The Draft EIS/EIR states "Downstream operations would include construction of a collection and handling facility at Link River Dam that would also collect fish from the East Side and West Side canals". Operation of the East Side and West Side canals may not occur under this alternative. This statement should be modified in the Final EIS/EIR to account for this potential outcome since decommissioning of the East Side and West Side facilities was proposed by PacifiCorp as part of the relicensing process (see PacifiCorp 2004a).
27	3.2	3.2-1			The Draft EIS/EIR states "Similarly, water quality parameters relevant to the analysis of fish disease and parasitism (e.g., water temperature, nutrient availability) are included here as part of the Proposed Action effects analysis; the full analysis of fish disease and parasitism is in Section 3.3, Aquatic Resources." There is no specific and direct evidence that the presence of dams causes fish disease in the Klamath River, and the spatial distributions of polychaete worms (invertebrate host for the salmonid parasites myxosporeans *Parvicapcula minibicornis* and *Ceratomyxa shasta*) are limited by dams. This statement should be revised to reflect that uncertainty is very high on factors controlling disease polychaete host abundance and disease infection prevalence in the Klamath River, as has been pointed out by the Klamath River Expert Panel on Chinook Salmon. As described by Foott et al. (2011), there is incomplete understanding of the interaction of environmental factors on the multiple elements of disease parasite life cycles, and requires further research to explain disease dynamics in the Klamath River.
28	3.2	3.2-5		Table 3.2-2	The "Fish & Aquatic Life" use designated for the Klamath River from Upper Klamath Lake to Keno Dam is: "Cool Water Species (no salmonid use)." The "Fish & Aquatic Life" use designated for the Klamath River from Keno Dam to the California border is "Redband or Lahontan Cutthroat Trout." OAR 340-041-0180, Figure 180A.
29	3.2	3.2-6	2nd para.		The quotation from ORS 468B.025 (which is a statute, not an "administrative ruling") is misleading because it omits the introductory phrase, "Except as provided in ORS 468B.050 or 468B.053." ORS 468B.050 provides for permits from the Oregon Department of Environmental Quality. Activities authorized by such a permit need not comply with ORS 468B.025.
30	3.2	3.2-7		Table 3.2-3	The statement under temperature that "Water temperatures must support all life stages of temperature-sensitive aquatic communities" is not an applicable criterion. The applicable criteria are the numeric biologically based criteria where the rules specify that those criteria apply. In addition,

Comment 30 cont.

Comment 31 - Other/General

Comment 32 - Water Quality

Comment 33 - Water Quality

Comment 34 - Water Quality

Comment 35 - Water Quality

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					OAR 340-041-0028(b) allows a cumulative increase of 0.3 ºC from all human sources when water temperatures exceed the applicable criterion. Comment 35 cont.
31	3.2	3.2-7	1st para.		The Draft EIS/EIR should state where the Hoopa Valley Tribe water quality standards apply on the Klamath River. Comment 36 - Water Quality
32	3.2.2.4	3.2-15 to 3.2-18			PacifiCorp does not waive, and expressly preserves, its legal challenge to the TMDL and TMDL models, and preserves its rights to challenge TMDL implementation plan measures and conclusions regarding the Klamath Hydroelectric Project's effects on water quality in other proceedings. Comment 37 - Water Quality
33	3.2.2.4.4	3.2-17	2nd bullet		Annual TP and TN reductions should also be reported as a percentage because the total reductions cannot be compared with existing loads as written. Comment 38 - Water Quality
34	3.2.3.2	3.2-22			Water temperature in the reach between Seiad Valley and Clear Creek commonly reach the high 20s and have exceeded 30 ºC, with minimum temperatures on the order of 25 ºC. This can be readily found in the USFWS and tribal data sets, but these common and extreme temperatures are not included in the Draft EIS/EIR. Comment 39 - Water Quality
35	3.2.3.4	3.2-24			Geologic sources of nutrients in the springs feeding the Klamath River and major and minor tributaries are large inputs. The springs below JC Boyle Dam have approximately 0.08 mg/l of orthophosphate and approximately 0.20 mg/l of nitrate. Several large, upper basin springs and major springs in the Shasta contribute large amounts of geologic nitrogen. These are natural sources of nutrients. These natural geologic sources are not given any detailed mention in the Draft EIS/EIR. Comment 40 - Water Quality
36	3.2	3.2-24	3rd para.		Under current conditions, and as described in the Draft EIS/EIR for "decades" to come, large fluxes of organic matter will be periodically released into the river from Upper Klamath Lake. According to studies upon which the Upper Klamath Lake TMDL analysis was based, very large fluxes could occur 2 out of every 8 years. These large nutrient and organic matter fluxes from Upper Klamath Lake are not explicitly considered in the Draft EIS/EIR. Comment 41 - Water Quality
37	3.2.3.4	3.2-24 to 3.2-26			There is no discussion in the Draft EIS/EIR on nutrient spiraling in river reaches. This is an important aspect of water quality conditions under the current dams-in condition, and highly important during the dams-out conditions. Specifically, as organic matter and nutrients are advected (transported) downstream they are sequestered in benthic algae in river reaches (for example, see Deas 2005, PacifiCorp 2006, FERC 2007). As the growth season (May to mid-August) progresses, these benthic elements begin to attain a large biomass and produce nutrients as excretion byproducts, excretion from grazers, natural levels of mortality and senescence, and loss to turbulence induced shear and

Comment 42 - Water Quality

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					abrasion. This "re-cycled" organic matter and nutrient source is then available to support primary production in downstream reaches. This is a well accepted topic in river limnology, and the Final EIS/EIR should mention this important "source" of nutrients.
38	3.2.3.5	3.2-25	1st para.		Reservoir turnover does not occur until October in Copco reservoir and as late as November for Iron Gate reservoir. Although small amounts of hypolimnetic water may be entrained in the outlet tower, these contributions are small compared to the total load washed in via the Klamath River (which, being warmer, tends to contribute to epilimnion water quality). Second paragraph: There is no measure of denitrification in the river reaches, nor reservoir reaches for that matter. Although denitrification can occur in river reaches, it is generally remarkably smaller than in reservoirs. Third paragraph: Nutrients may be limiting - perhaps, but *Epithemia sorex*, the dominant periphyton, is a nitrogen fixer. Thus, there is no real nitrogen limit on these species.
39	3.2	3.2-25	3rd para.		There are no studies showing that the Project reservoirs are net producers of orthophosphate, ammonium, or nitrate.
40	3.2.3.6	3.2-28			The pH section of the analysis should explain the low buffering capacity of the Klamath River.
41	3.2.3.6	3.2-28			On the topic of pH, the fact that the Klamath River from Upper Klamath Lake to the estuary is weakly buffered, and that this is a function of geology (i.e., natural) is not well presented. Further, even a basic analysis (spreadsheet) of primary production and implications of the carbonate cycle would illustrate that modest amounts of primary production are going to result in pH above 8.5. This is a simple analysis, but not completed in the Draft EIS/EIR. The Klamath River from approximately Interstate 5 to Scott River can have pH in excess of 9 in June (not only August-September). Further, pH in excess of 8.5 can occur all the way down to Clear Creek, not just immediately below Iron Gate Dam.
42	3.2.3.7	3.2-30			While it is true that microcystin can accumulate in aquatic biota, the information presented in this paragraph is misleading and should be corrected. This discussion needs to include all the results for fish sampled for microcystin in the Klamath River. Sampling for microcystin bioaccumulation in resident fish in Copco and Iron Gate reservoirs occurred in 2007, 2008, and 2009; not just 2007 as referenced in the Draft EIS/EIR. In 2008, a total of 272 resident fish (yellow perch, crappie and rainbow trout) tissue were sampled and all results were non-detect for microcystin. In 2009, a total of 43 fish tissue and liver samples were collected from yellow perch, and all results were non-detect for microcystin. These studies are posted on PacifiCorp's Klamath website (http://www.pacificorp.com/es/hydro/hl/kr.html#). The data from the anadromous fish sampling for microcystin that was done in 2007 and 2010 also should be presented and discussed. In 2007, fish and

Comment 42 cont.

Comment 43 - Water Quality

Comment 44 - Water Quality

Comment 45 - Water Quality

Comment 46 - Fish

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					Comment 46 cont. liver samples were collected from 11 adult Chinook salmon and 8 steelhead. All the results were non-detect for microcystin (CH2M Hill 2009). In 2010, tissue and liver samples were collected from 25 steelhead, 20 fall Chinook and 3 coho in the Klamath River. All of the fish tissues were non-detect for microcystin, and 4 Chinook livers and 1 steelhead liver had detectable amounts of microcystin present. The analysis needs to go beyond discussion of microcystin presence in tissues, and discuss what the quantities say about the associated levels of potential health risk. The Draft EIS/EIR also needs to distinguish where microcystin concentrations have been detected – in fish tissue versus liver - since it is quantities in the tissue that is consumed that pose a human health risk. To PacifiCorp's knowledge, no microcystin has been found in adult salmonid fish tissue in the Klamath River. The Draft EIS/EIR discusses the risk to fish but presents no evidence to show what harm, if any, occurs at the individual or population level from microcystin. Any analysis on fishery effects needs to distinguish between resident and anadromous fish since most of the anadromous salmonids enter the river as adults to spawn and die.
43	3.2.4.1	3.2-33 to 3.2-36			Comment 47 - Water Quality PacifiCorp's position that the compliance scenarios and the technical analysis and modeling supporting the California Klamath River TMDL are flawed was presented during the development of the TMDL and is contained in the Petition for Writ of Mandate filed to challenge the same.
44	3.2.4.1	3.2-34	Last para.		In Chapter 2, the Draft EIS/EIR states that Interim Measures 2, 3, 4, 5, 6, 7, 8, 13, 14 and 17 from the KHSA are included in the No Action/No Project alternative. The Water Quality analysis in Chapter 3 discusses only IMs 3, 7, and 8 with regard to effects of the No Action alternative. The omitted IMs should be included in the No Action/No Project alternative in Chapter 3, including the comprehensive suite of restoration actions to occur under IM2 Coho Enhancement Fund. With regard to IM 3 (Turbine Venting), the discussion in Chapter 3 does not include the most recent data (PacifiCorp 2011b), and incorrectly concludes that the effectiveness of turbine venting is unlikely or unknown. The final paragraph on this page also portrays that Interim Measures 7, 8, and 13 are part of PacifiCorp's Habitat Conservation Plan. This should be corrected since IMs 7, 8, and 13 are not included as part of PacifiCorp's HCP (PacifiCorp 2011a). Comment 48 - Water Quality
45	3.2.4.1	3.2-34	Last para.		The Draft EIS/EIR states "IM 5, Iron Gate Flow Variability, would alter flow variability, but the flows would stay within the historic range of operations." This statement should be corrected because implementation of IM 5 has resulted in flows outside of historic operations. In February 2011, consistent with IM 5, PacifiCorp, in coordination with Reclamation, agencies, and stakeholders, delivered flows in excess of 5,000 cfs below Iron Gate dam through unprecedented operations at its hydroelectric facilities. The Final EIS/EIR should make this correction.

Comment 49 - Water Quality

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46	3.2.4.1	3.2-35	1st para.		The Draft EIS/EIR states "Planning efforts under IM 11, Interim Water Quality Improvements, are ongoing; however, pilot scale projects are still in the data collection or planning stage, so an assessment of water quality impacts is not yet practical". The Draft EIS/EIR, however, considers KBRA and TMDL actions in the assessment of water quality (and fisheries) impacts, even though they are only (and at most) at a planning level.
47	3.2.4.1	3.2-35	2nd para.		This text indicates that No Action explicitly includes all TMDLs as "reasonably foreseeable actions". However, a hard-to-follow aspect of this assumption throughout the following analyses of No Action in the "Water Quality" section (and also subsequent "Algae" section), is that No Action assumes full attainment of the TMDLs eventually, but not during the "long term" time frame (of about 50 years) assumed in the analyses. Many in the basin, including PacifiCorp, have presented substantial technical critiques of these TMDLs, including information indicating the TMDLs are unrealistic and unattainable. Independent assessments of conditions for anadromous fish in the Klamath Basin by the National Research Council (NRC 2004, NRC 2008) and the Klamath River Expert Panels (Dunne et al. 2011, Goodman et al. 2011), although not referring to the TMDLs specifically, indicate that very substantial water quality improvements in the Klamath Basin, such as assumed in the TMDLs, are unrealistic, unlikely, or at best highly uncertain. Therefore, the assumption of full attainment of TMDLs results in an analysis that assumes dramatic long-term water quality improvements in the basin, although the text later admits that "TMDL implementation mechanisms and timing are currently unknown".
48	3.2.4.1	3.2-35	3rd para.		In the analysis, "short-term" is defined as less than two years, but some sedimentation (up to 5 feet, as reported in text), DO, and benthic algae issues will last for several years.
49	3.2.4.1.1	3.2-36			The natural conditions scenario used in the TMDL model is distinct from the environmental baseline used for purposes of the environmental analysis in this EIS/R. Thus, any conclusions in the DEIS/R regarding regulatory compliance are not appropriate or relevant for any other purposes outside this document.
50	3.2.4.1.1	3.2-36			Regarding temperature modeling, PacifiCorp documentation (e.g., PacifiCorp 2004b) makes it clear that the simulation models used for the FERC process were not calibrated for winter due to lack of available data. The TMDL models suffer from the same defect. Yet, winter results from the models are used throughout the document. (See PacifiCorp comments on the Oregon and California TMDLs).
51	3.2.4.1.1 and 3.2.4.1.3	3.2-36 and 3.2-			Regarding TMDL simulations used in these assessments, please see PacifiCorp comments regarding both California and Oregon TMDL documents. Several key elements that are addressed in detail in PacifiCorp's comments include, but are not limited to: (1) infeasible boundary conditions at Link Dam

Comment 50 - Water Quality

Comment 51 - Water Quality

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Comment 54 - Water Quality

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		37			which render the assessment and load allocations unachievable (essentially calling for a trophic shift in Upper Klamath Lake from hypereutrophic to mesotrophic conditions for several constituent forms; (2) the fate of these nutrients downstream, wherein conditions below Keno Dam are so low that the modeling analysis show no growth for much of the summer (infeasible); (3) the temperature modeling uses an erroneous factor that reduces solar radiation by 20 percent, leading to erroneous underprediction by the temperature models. All TMDL temperature modeling results, particularly in California, are erroneous.
52	3.2.4.1.2	3.2-37	1st sentence		Optimization is an analytical technique where objective functions are developed along with selected constraints and a full set of historical or synthesized data are then mathematically assessed to identify the mathematical optimum.
53	3.2.4.2.2.3	3.2-45		Table 3.2-10	Footnote 1 of Table 3.2-10 incorrectly states that the source of the Oregon public health guidelines stated in the table is OAR 340-041, which sets forth Oregon's water quality standards. The footnote is not correct. Neither OAR 340-041 nor Oregon's water quality standards include any such guidelines.
54	3.2.4.3.1.1	3.2-47	2nd para.		The assertion that Hydroelectric Project impoundments will result in water temperatures that do not meet Oregon temperature standards and that adversely affect beneficial uses in the short-term and long-term is not supported by the facts and reflects a misunderstanding of Oregon's temperature standards. Oregon's temperature standards are based on an allowable insignificant increase in natural temperatures where natural temperatures exceed the otherwise applicable numeric temperature criterion. The Oregon Klamath River TMDL shows that human sources, including the Hydroelectric Project, have little effect on Klamath River temperatures (outside the bypass reach, where the resulting colder temperatures are beneficial). Moreover, the Oregon Klamath River TMDL itself overstates the Hydroelectric Project's effects on temperature due to an error in the temperature model used for the TMDL.
55	3.2.4.3.1.1	3.2-49	1st para.		PacifiCorp's current TMDL implementation obligations are limited to the interim measures identified in the KHSA, pursuant to the terms of the KHSA and as acknowledged by the Klamath River TMDL Staff Report.
56	3.2.4.3.1.1	3.2-49	2nd para.		The applicable temperature criterion in the Klamath River in Oregon is not 16 ºC. The criterion downstream of Keno dam is 20 ºC., unless the natural temperature is higher, in which event the criterion is equal to the natural temperature. The criterion also allows an insignificant cumulative human contribution (0.3 ºC) when the criterion is exceeded.

Comment 54 cont.

Comment 55 - Water Quality

Comment 56 - Water Quality

Comment 57 - Water Quality

Comment 58 - Water Quality

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57	3.2.4.3	3.2-50			Comment 59 - Water Quality The Draft EIS/EIR states "The anticipated increases in water temperatures due to climate change would also occur over a timescale of decades and would act in opposition to improvements expected from successful TMDL implementation throughout the Upper Klamath Basin". Here and elsewhere in the Draft EIS/EIR, climate change is identified as an opposing factor to basin restoration measures. This Draft EIS/EIR analysis period is 50 years. Climate change is expected to continue past 50 years. There is no discussion on longer term effects.
58	3.2.4.3	3.2-50			Comment 60 - Water Quality The Draft EIS/EIR states that the "Four Facilities alter the natural thermal regime..." Throughout the Draft EIS/EIR, the document should separately evaluate the water quality effects of the four facilities, which is necessary to allow for an assessment of the water quality effects that may be expected under different alternatives.
59	3.2.4.3	3.2-50 to 3.2-125			Comment 61 - Water Quality The Draft EIS/EIR's analyses of water quality effects assumes full attainment of the Oregon and California TMDLs but repeatedly states "implementation mechanism and timing unknown". The Draft EIS/EIR's analyses of water quality effects also assume the KBRA is a component of the Proposed Action that "includes programs that could affect water quality". The substantial uncertainty associated with these assumptions is not discussed in the Draft EIS/EIR.
60	3.2.4.3	3.2-50 to 3.2-71			Comment 62 - Water Quality Uncertainty around the success or failure of TMDL-related water quality improvement activities is not addressed in the Draft EIS/EIR.
61	3.2.4.3.1.1	3.2-51			Comment 63 - Water Quality Attainment of the California TMDL for the Klamath River will not achieve temperature compliance because the models are in error due to an incorrect assumption of solar radiation reduction, producing erroneously low simulated water temperatures. The TMDL's tributary shade assessments are incorrect as well. (See PacifiCorp TMDL comments, PacifiCorp [2009] and PacifiCorp [2010]).
62	3.2.4.3.1.1	3.2-52	2nd para.		Comment 64 - Fish What is the timing of "late migrants?" Fish disease is prevalent in mid- to late-April onward.
63	3.2.4.3.1.1	3.2-55			Comment 65 - Algae In terms of current reservoir algal populations, in-reservoir treatment or removal options are not discussed in the Draft EIS/EIR as a potential mechanism to reduce excessive algal blooms in-reservoir or downstream. There are also other mechanisms to reduce algal concentrations downstream.
64	3.2.4.3.1.3	3.2-58	1st para. and 2nd para.		Comment 66 - Water Quality In the first paragraph, the Draft EIS/EIR provides no quantitative measure of amount of TP from sediment release in hypolimnion to epilimnion. In the second paragraph, the Draft EIS/EIR provides more qualitative speculation that the Williamson River Delta Project and Agency Lake and Barnes Ranch Project will improve downstream water quality.

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65	3.2.4.3.1.3	3.2-58	2nd para.		Comment 67 - Algae The statement that nutrients do not meet Oregon water quality criteria for nuisance algae growth and the Oregon antidegradation rule does not refer to any waterbody in Oregon. Within the area of the Hydroelectric Project in Oregon, the water quality criteria for nuisance algae growth is not violated, and Oregon has not listed this portion of the Klamath River on Oregon's 303(d) list for violating the nuisance algae criterion. Nor is there any violation of Oregon's antidegradation rule in this reach.
66	3.2.4.3.1.3	3.2-60			Comment 68 - Water Quality Shasta River TMDL only addresses DO and temperature. Nutrients are not listed in this TMDL.
67	3.2.4.3.1.3	3.2-61			Comment 69 - Water Quality Denitrification is not included in the model. Neither are other nitrogen related processes, including atmospheric deposition, which would be a source.
68	3.2.4.3.1.4	3.2-63	2nd para.		Comment 70 - Water Quality The assertion that the Hydroelectric Project's continued impoundment of water would have a significant adverse effect on dissolved oxygen levels in the Oregon portion of the Hydroelectric Reach for decades into the future is inconsistent with the Oregon Klamath River TMDL, which shows that the Project has only modest effects on dissolved oxygen in Oregon. These effects can be readily addressed in the short term even in the absence of reductions in the upstream nutrient sources that cause the problem.
69	3.2.4.3.1.4	3.2-64	1st para.		Comment 71 - Water Quality The Draft EIS/EIR states that pilot studies on turbine venting have not indicated that it is a viable long term solution. However, PacifiCorp testing results indicate that turbine venting provides appreciable DO improvement in release waters from the Iron Gate powerhouse. The EIS/EIR needs to be updated to reflect this information.
70	3.2.4.3.1.4	3.2-65			Comment 72 - Water Quality The monthly DO values are not consistent with PacifiCorp simulations. The TMDL model has erroneously low simulated temperatures, leading to higher DO values.
71	3.2.4.3.1.4	3.2-65	1st para.		Comment 73 - Water Quality PacifiCorp's position on the accuracy of model-predicted compliance was presented during the development of the TMDL and is contained in the Petition for Writ of Mandate filed to challenge the same. In addition, same comment as above, regarding PacifiCorp's TMDL implementation obligations. PacifiCorp's current TMDL implementation obligations are limited to the interim measures identified in the KHSA, pursuant to the terms of the KHSA and as acknowledged by the Klamath River TMDL Staff Report.
72	3.2.4.3.1.4	3.2-67			Geology is a major factor in pH response to primary production. pH will persist as a problem well after dam removal, because at low alkalinity levels, even modest primary production will lead to California criteria (8.5) being exceeded.

Comment 74 - Water Quality

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73	3.2.4.3.1.6	3.2-68	4th para.		The assertion that seasonal algae blooms exceed Oregon water quality criteria for toxic substances and the Oregon antidegradation rule is not supported for J.C. Boyle Reservoir.
74	3.2.4.3.1.6	3.2-70			There should be an explicit presentation of which algal toxins are relevant in this discussion. The approach of just stating "cyanotoxins" suggests that there are data on multiple toxins, but the bulk of the data are associated only with microcystin. In addition, the discussion needs to specifically address the relevant times of year (e.g. month). A simple exceedance plot would clearly illustrate the frequency and magnitude of the problem. Note that there are problems at Upper Klamath Lake as well.
75	3.2.4.3.1.6	3.2-70	2nd para.		There is no solid evidence that algae toxins are transported many miles downstream. Algae toxins have been higher in the lower river compared to sampling immediately below Iron Gate dam.
76	3.2.4.3.1.6	3.2-76	1st para.		The Draft EIS/EIR states "Bioaccumulation of algal toxins (i.e., microcystin) has been documented in fish and mussel tissue in the Klamath River downstream of Iron Gate Dam (Kann et al. 2010)". The sentence is incorrect. Microcystin has been found in small amounts in the liver of a small percentage of the fish sampled in the Lower Klamath River. No microcystin has been found in fish tissue.
77	3.2.4.3.2.1	3.2-76	Last para.		TMDL results are not an appropriate basis for comparing alternatives. PacifiCorp's position on the TMDL is contained in its Petition for Writ of Mandate challenging the TMDL. There are numerous issues and inconsistencies in the modeling approach and application of results. For example, TMDL temperature and nutrient results are inaccurate. TMDL temperature results used in the analysis of the upper Klamath Basin are biased by a 20 percent reduction of solar energy. The TMDL models do not conserve nutrients. Finally, TMDL analyses only considered year 2000 environmental conditions. This year is not representative of conditions in the Klamath Basin.
78	3.2.4.3.2.1	3.2-77	Last para.		The applicable temperature criterion in the Klamath River in Oregon is not 16 ºC. The criterion downstream of Keno Dam is 20 ºC., unless the natural temperature is higher, in which event the criterion is the natural temperature. In addition, the criterion allows an insignificant cumulative human contribution (0.3 ºC) when the criterion is exceeded.
79	3.2.4.3.2.1	3.2-79		Figure 3.2-4	This figure does not support statements in the Draft EIS/EIR analysis. As an example, a decrease in "long-term summer/fall water temperatures 3-6 ºC [5.4-10.8 ºF]" is not supported by the figure presented. Figure 3.2-4. "Estimated Changes in Daily 1 Maximum Klamath River Water Temperatures at ≈RM 198 due to the Presence of Copco 1 and 2 Reservoirs for the 2000 Calendar Year" shows an expected decrease of, at most, 3 ºF and an average decrease of maybe 1-1.5 ºF.

Comment 75 - Algae

Comment 76 - Algae

Comment 77 - Algae

Comment 78 - Algae

Comment 79 - Water Quality

Same as Comment 58

Comment 80 - Water Quality

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80	3.2.4.3.2.1	3.2-80			The Draft EIS/EIR states "As with the seasonal temperature effect, the influence on daily temperature fluctuations is generally absent farther downstream, at the confluence with the Scott River (RM 143.9; see Figure 3.2-6). The Draft EIS/EIR goes on to state "The KRWQM indicates that the temperature influence of the Hydroelectric Reach is mostly ameliorated by RM 66 at the confluence with the Salmon River (see Figure 3.2-7)." Regarding these statements, PacifiCorp model results (see PacifiCorp 2004b, 2008) show that the "thermal lag" effects of the Project reservoirs on water temperatures below Iron Gate dam (RM 190) progressively diminish until reaching a downstream location where effects are absent. From December through July, the effects are quite small or absent by the time the river reaches the confluence with the Scott River (RM 143.9). In August and November, the effects are small or absent by the time the river reaches Seiad Valley (RM 120), and in September and October, by the time the river reaches the confluence with Clear Creek (RM 95).
81	3.2.4.3.2.4	3.2-110			The Draft EIS/EIR describes the results of the Klamath TMDL model relative to the water quality compliance. However, TMDL model results are not an appropriate basis for comparing alternatives. PacifiCorp's position on the TMDL is contained in its Petition for Writ of Mandate challenging the TMDL. There are numerous issues and inconsistencies in the modeling approach and application of results. For example, TMDL temperature results used in analysis of the upper Klamath Basin are biased by a 20% reduction of solar energy.
82	3.3.3.3	3.3-34	1st para.		The Draft EIS/EIR described that summer water temperatures are naturally high in Upper Klamath Lake, with maximum water temperatures commonly of 22 to 24°C, and which approach a maximum of 30°C near the surface. The Draft EIS/EIR goes on to state "Although prolonged exposure to these high temperatures could be lethal for some species, these temperatures remain within tolerance criteria for migrating adult anadromous salmonids (Hamilton et al. 2011)". However, later on this page (last sentence) the Draft EIS/EIR states "temperatures above 22 to 25°C are potentially lethal to anadromous salmonids". The Final EIS/EIR needs to reconcile what is the appropriate temperature tolerance for migrating salmonids and how "lethal temperatures" can still be in the "tolerance" range.
83	3.3.3.3	3.3-34	1st para.		The Draft EIS/EIR states that "Wetlands surround this bay and would be expected to provide juvenile salmonids with excellent rearing habitat". The Draft EIS/EIR should consider the predation rates associated with these areas and factor predation into the assessment of this alternative.
84	3.3.3.3	3.3-34	1st para.		The Draft EIS/EIR states "Stress associated with high water temperatures can make cold water species more vulnerable to disease and parasites, and have been associated with fish kills in the Klamath River downstream of Iron Gate Dam during low flow periods in late summer (Hardy and Addley 2001)." This statement should be corrected to say that fish kills have been observed "in the lower Klamath River"

Same as Comment 79

Comment 81 - Water Quality

Comment 82 - Fish

Comment 83 - Fish

Comment 84 - Fish

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					Comment 84 cont. rather than "downstream of Iron Gate Dam".
85	3.3.3.3	3.3-34	Last para.		Comment 85 - Fish The Final EIS should discuss in more detail how springtime temperatures may potentially affect outmigrating smolts, especially steelhead. Temperatures of 11.3 to 13.3°C are consistently cited in the literature as the uppermost limit that will not interfere with steelhead smolt development. Warmer temperatures higher than those cause steelhead smolts to stop migrating and residualize. Temperatures in the Link River and Klamath River above J.C. Boyle are commonly above 12°C in April and 15°C in May.
86	3.3.3.3	3.3-37	2nd para.		Comment 86 - Fish The Draft EIS/EIR states "an altered river channel below Iron Gate Dam, where the bed has been atypically stable, has provided favorable habitat for the polychaete worm host, likely increasing the parasite load to which the fish are exposed". The Final EIS should review Bartholomew's data and explain how such data does or does not support such a statement.
87	3.3.3.3	3.3-41	1st para.		Comment 87 - Fish The Draft EIS/EIR cites the Bureau of Land Management (2002) instream flow study in the reaches between J.C. Boyle Reservoir and Iron Gate dam. The Final EIS/EIR should also include discussion of PacifiCorp's IFIM studies in these reaches conducted for the FERC relicensing process (see PacifiCorp 2004c).
88	3.3.4.1	3.3-49	3rd para.		Comment 88 - Fish The Draft EIS/EIR indicates that neither implementation of total maximum daily loads (TMDLs) nor climate change was incorporated into water temperature modeling. The Draft EIS/EIR should also indicate that changes in fish production were not considered or estimated under these altered conditions in the analysis for the No Action alternative.
89	3.3.4.1	3.3-50	1st para.		Comment 89 - Fish The Draft EIS/EIR lists the factors that Bartholomew and Foott (2010) determined could, if co-occurring, lead to high *C. shasta* and *P. minibicornis* rates. These factors included: 1) physical habitat components; 2) microhabitats with low velocity and stable flows; 3) close proximity to spawning area; and 4) water temperatures higher than 15ºC. Throughout the Draft EIS/EIR, claims are made that factors such as nutrient levels and spawning densities affect the incidence of *C. shasta* yet no data are provided to support these assertions. In fact, on page 3.3-152 the statement is made "a small proportion of spawning salmon produce the bulk of myxospores" which contradicts the assertion that it is the density of spawners that affect myxospores.
90	3.3.4.1	3.3-50	2nd para.		The Draft EIS/EIR cites only the Bureau of Land Management (2002) instream flow study in the reaches between J.C. Boyle Reservoir and Iron Gate dam. The Final EIS/EIR should include discussion of PacifiCorp's IFIM studies in these reaches conducted for the FERC relicensing process (see PacifiCorp

Same as Comment 87

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					2004c).
91	3.3.4.2	3.3-53			The analysis discussed in this section of the Draft EIS/EIR does not include implementation of the NOAA's Coho Recovery Plan, the effects of continued expenditures of $10-20 million a year on various Basin-wide restoration projects (e.g., stream habitat improvements), and other basin conservation plans. These measures should be included in the analysis. Also, in Chapter 2, the Draft EIS/EIR states that Interim Measures 2, 3, 4, 5, 6, 7, 8, 13, 14 and 17 from the KHSA are included in the No Action/No Project alternative. However, the Aquatics Resources (Fisheries) in Chapter 3 discusses only IMs 3, 7, and 8 with regard to effects of the No Action alternative. Notably absent is any mention of the comprehensive suite of restoration actions to occur under IM 2 Coho Enhancement Fund. The habitat enhancement activities under IM 2, as described in PacifiCorp's HCP (PacifiCorp 2011a), will result in long-term improved habitat conditions and access to habitat that will be targeted to benefit coho salmon, but will benefit Chinook salmon and steelhead as well.
92	3.3.4.3	3.3-57	3rd para.		The Draft EIS/EIR states "Bartholow et al. (2005) and PacifiCorp (2004a) showed that the reservoirs delay seasonal thermal signatures by 18 days". However, PacifiCorp model results (see PacifiCorp 2004b, 2008) show that the delay is actually 18 days or less in the river from Iron Gate dam to the confluence with the Shasta River (RM 176). The effects of the Project reservoirs on water temperatures below Iron Gate dam (RM 190) progressively diminish until reaching a downstream location where effects are absent. The Final EIS should clarify this statement accordingly.
93	3.3.4.3	3.3-57	3rd para.		The Draft EIS/EIR indicates that water temperatures in the mainstem and tributaries are expected to remain similar to existing conditions because implementation of the TMDLs would likely be offset by the effects of climate change. The Final EIS should clarify the assumptions used in the fish modeling concerning this matter.
94	3.3.4.3	3.3-58	1st para.		In this paragraph, the Draft EIS/EIR discussed the effects that "increasing temperatures could place on salmonids". However, just prior, the Draft EIS/EIR indicates that stream temperatures will at first decrease then remain similar to today. These statements should be reconciled.
95	3.3.4.3	3.3-58	3rd para.		In this paragraph, the Draft EIS/EIR indicates that No Action would result in "continued substantial deleterious effects on salmon in terms of fish disease" in the reach "below Iron Gate Dam" (page 3.3-58). The reach "below Iron Gate Dam" is not specifically defined in this section of the Draft EIS/EIR, and therefore the reader could conclude that the reach extends to the ocean. Data presented in Bartholomew and Foott (2010) show that polychaete numbers and infection rates are low for the Iron Gate dam to just above the Shasta River reach; the mainstem reach that has the highest number of

Comment 90 - Fish

Comment 91 - Fish

Comment 92 - Fish

Comment 93 - Fish

Comment 94 - Fish

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Num.	Document Section Number	Page Number	Paragraph or Line Number	Figure or Table Number	Comment
					Comment 94 cont. adult spawners. Thus, in relation to stream reaches downstream of this point, polychaetes are not abundant nor does the reach produce high infection rates. The Final EIS/EIR should clarify and correct this point.
96	3.3.4.3	3.3-61	1st para.		Comment 95 - Fish The Draft EIS/EIR states "Conditions under the No Action/No Project Alternative would continue to contribute to elevated concentrations of disease parasites and would provide the conditions required for the cross infection of fish and polychaetes", and then states "These interacting factors could decrease the viability of Chinook and coho salmon populations in the future". The Draft EIS/EIR also states "Downstream from the hydroelectric facilities, water conditions are also ideal for promoting fish disease, in that they allow parasites to thrive" (page 3.6-15). The assumption that continued Project operations could decrease the viability of Chinook stocks in the future from disease is not supported by an analysis. Comment 96 - Fish
97	3.3.4.3	3.3-63	2nd para.		The Draft EIS/EIR states "Maximum temperatures often reach 25°C during summer, considered lethal for most Pacific salmon (Sullivan et al.2000)". The Final EIS should clarify how temperature conditions present above Keno will impact salmon in view of this statement.
98	3.3.4.3	3.3-65	2nd para.		The Draft EIS/EIR states "Under the No Action/No Project Alternative, upstream-migrating adult coho salmon will continue to be exposed to high water temperatures". Available scientific information suggests that Klamath River temperatures do not pose a significant impact to coho. The Final EIS should further evaluate this statement. Comment 97 - Fish
99	3.3.4.3	3.3-82	2nd para.		The Draft EIS/EIR states "Using this point as the downstream extent of bedload-related effects, 8 miles of channel could be affected by sediment release and resupply". Available information suggests that portion of the channel with the highest polychaete population is below this point (i.e., near Cottonwood Creek) (Citation). The Final EIS should clarify the statement. Comment 98 - Fish
100	3.3.4.3	3.3-84	2nd para.		The Draft EIS/EIR and the "Conceptual Model for Disease Effects in the Klamath River" (a report which accompanies the Draft EIS/EIR) seem to differ in their characterization of bedload impacts. The Final EIS should take this into account to avoid inconsistencies. Comment 99 - Fish
101	3.3.4.3	3.3-88	1st para.		The Draft EIS/EIR states that water temperatures would be "more favorable for salmonids in the mainstem" under the Proposed Action. However, this conclusion is not supported by available information either spatially or temporally. PacifiCorp (2004b, 2008) concludes that the Project-related effects progressively diminish until reaching a downstream location where effects are absent. From December through July, the effects are quite small or absent by the time the river reaches the

Comment 100 - Fish

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					Comment 100 cont. confluence with the Scott River (RM 143.9). In August and November, the effects are small or absent by the time the river reaches Seiad Valley (RM 120), and in September and October, by the time the river reaches the confluence with Clear Creek (RM 95). In addition, from a temporal perspective, Project dams serve to cool water temperatures during the spring months, which may lessen C. shasta severity in the reach of the river downstream of Iron Gate dam. Also, Project dams mitigate summer peak temperatures, which decreases stress on salmonids (see Figure 3.2-4).
102	3.3.4.3	3.3-88	4th para.		Comment 101 - Fish The Draft EIS/EIR's conclusion on fish disease effects (page 3.3-88) is not supported by the data presented in Bartholomew and Foott (2010) as cited by the Draft EIS/EIR. Figure 2.4 in Bartholomew and Foott clearly indicates that the reach extending from Iron Gate dam to just above the Shasta River has the lowest infection rates observed in the Klamath River. The Draft EIS/EIR states that "The removal of the Four Facilities would be likely to reduce habitat quality for the polychaete host by reducing reservoir habitat" (page 3.3-88). However, the reservoirs do not support populations of polychaetes (see analysis citation of Bartholomew and Foott 2010), and in fact evidence suggests the reservoirs may act to reduced disease spores by settling and retention during flow through the reservoirs (Stocking 2006).
103	3.3.4.3	3.3-91	2nd para.		Comment 102 - Fish The conclusion that the Proposed Action would result in flows more favorable to all life stages of trout in the peaking reach was based on results of the Bureau of Land Management (2002) report. As noted below, the Final EIS should include an analysis of PacifiCorp IFIM studies that provide relevant information on this point (see PacifiCorp 2004c).
104	3.3.4.3	3.3-91	5th para.		Comment 103 - Fish The Draft EIS/EIR indicates that the Proposed Action would result in a shift in the timing of the minimum flows. The Final EIS/EIR should provide an analysis supporting this statement.
105	3.3.4.3	3.3-99	3rd para.		Comment 104 - Fish The Draft EIS/EIR states that "Incidence of disease are expected to be reduced by enhancing the scour capabilities of flow by uninterrupted sediment transport, a flow regime that more closely mimics natural conditions, thereby disturbing the habitat of the polychaete worm that hosts *C. shasta*". The Draft EIS/EIR further states "Reducing polychaete habitat will likely increase abundance of smolts by increasing outmigration survival, particularly for Type I and Type III life-histories". The Final EIS should provide a technical analysis to better support this statement.
106	3.4.3.1.	3.4-4	1st para.		There are not consistent, large blooms of Anabaena in the Klamath Basin. Recent public health monitoring has documented sporadic peaks of Anabaena in some areas in some years, and there is no regular pattern. Anabaena peaks are much less frequent and widespread than those of Aphanizomenon. There is no evidence that the Anabaena produces any toxins, and the testing to date

Comment 105 - Algae

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					on this cyanobacterium has not detected any toxins (see the kbmp.net website for public health results and annual summaries that are conducted under the KHSA Interim Measure 15).
107	3.4.3.3	3.4-5			The Draft EIS/EIR states "Sediment core studies indicate that Upper Klamath Lake was likely a historically biologically productive lake (i.e., the lake produced abundant fish and blue-green algae blooms) as indicated by high nutrient concentrations (particularly phosphorus) in the sediments for the last thousand years (Eilers et al. 2001)". Remove the word "likely", since there are numerous historic records showing that Upper Klamath Lake was historically eutrophic.
108	3.4.3.3	3.4-5			The Draft EIS/EIR states "Additional analysis of sediment cores suggests that Upper Klamath Lake water quality has changed substantially over the past 100 years as consumptive water use practices (e.g., irrigation, municipal uses, wetland diking and draining [i.e., conversion of wetlands to agricultural land]) and accompanying changes in land use practices throughout the upper Klamath and Lost River watersheds have increased (Walker 2001)". For the sake of providing proper guidance for the Secretarial Determination process, the Draft EIS/EIR needs to clarify what "changed substantially" means. This clarification will give a clearer picture of the effects of anthropogenic activities versus the natural state of Upper Klamath Lake. If the lake was already nutrient rich in its natural condition, being "changed substantially" by anthropogenic activities over the past 100 years could mean simply the addition of nutrients that may not constitute a change in trophic status. If so, projects that are implemented to reduce anthropogenic nutrient loadings into the lake may be limited in their ability to correct water quality conditions.
109	3.4.3.4	3.4-7			The Draft EIS/EIR states "Data from 2007 also indicate microcystin bioaccumulation in juvenile salmonids reared in Iron Gate hatchery". The sentence should read that microcystin "can" accumulate, since only some fish sampled showed signs of accumulation.
110	3.4.3.5	3.4-7			The Draft EIS/EIR states "Despite this relatively low abundance, however, algal toxins are a critical concern in this reach because they are released from the reservoirs in dissolved phase, as well as in intact algal colonies that can remain viable along the low-velocity margins of the river where little mixing occurs (Kann and Corum 2009)". These algal colonies could have been transported from reservoirs upstream or a result of in-situ production (i.e., in backwater or estuary areas with conditions, such as nutrients and light, which can support *Microcystis* growth).
111	3.4.3.4	3.4-7	1st para.		Toxin accumulation sampling in the liver and muscle in both resident and anadromous fish have had mixed results based on work performed from 2007-2010. No toxin has been detected in anadromous fish muscle tissue, and a small sample size has had microcystin detected in the liver. While the

Comment 105 cont.

Comment 106 - Algae

Comment 107 - Algae

Comment 108 - Algae

Comment 109 - Algae

Comment 110- Algae

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					Comment 110 cont. potential for fish exposure may exist during algal bloom season, the point needs to be made that fish are mobile and may not occupy the bloom area. The public health sampling is taken at the water surface and fish are typically located deeper in the water column. Therefore, there is a limit to the comparisons that can be made regarding public health sampling results and microcystin concentrations in fish.
112	3.4.3.4	3.4-7	2nd para.		Comment 111 - Algae The Draft EIS/EIR suggests that Project reservoirs are the source of *Microcystis* and microcystin through the 190 miles of the Klamath River downstream and in the estuary. This is misleading. Rather, the Draft EIS/EIR should describe that the presence of *Microcystis* can occur throughout the system, including upstream of the Project reservoirs (for example, in Upper Klamath Lake), where conditions, such as nutrients, light, and slow-moving water environment (i.e., pools, backwater eddies, estuary), are present to support *Microcystis* growth.
113	3.4.3.5	3.4-7	4th para.		Comment 112 - Algae There have been no definite studies (e.g., isotope markers) to verify that the cyanobacteria or associated toxins found in the Klamath River downstream of Iron Gate dam originate in the reservoir. While some of this material may be transported, it is certainly possible that the back eddy and slack water habitat of the Klamath River represents conditions (water temperature, light levels, flow rates, and nutrient availability/ratios as described in section 3.4.4.1) that can produce cyanobacteria and associated toxins. This possibility should be discussed in the Final EIS/EIR. Also, the Final EIS/EIR needs to discuss the time lag between the time that high algal blooms are found in the reservoir (mid July) and the river (end of August) (i.e., what is the reason/mechanism for this 4 to 6 week delay?).
114	3.4.3.6	3.4-8	Last para.		Comment 113 - Algae This section needs to be updated with the public health sampling that has been done since 2007. Public health sampling occurs weekly along the Klamath River from below Iron Gate dam to the estuary, and that data is located on the Klamath Basin Monitoring Program website (www.kbmp.net). There are numerous instances where both algae and toxin data at sites in the lower river (i.e., Brown Bear access) are higher than the site just below Iron Gate dam.
115	3.4.3.6	3.4-9			Comment 114 - Algae The Draft EIS/EIR states "These instances of elevated levels of *M. aeruginosa* corresponded with elevated levels measured in the lower Klamath River, suggesting that *M. aeruginosa* is transported from the Klamath Hydroelectric Project reservoirs into the lower river and subsequently into the estuary". Rather, the Draft EIS/EIR should describe that the presence of *Microcystis* and microcystin is directly related to the presence of conditions, such as nutrients, temperature, light, and slow-moving water environments (i.e., pools, backwater eddies, estuaries) that are well known to support *Microcystis* growth. The Final EIS/EIR should provide a more balanced discussion that includes acknowledgement that *Microcystis* is a common cyanobacteria in lakes, rivers, and estuaries around

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					Comment 114 cont. the world, where conditions are suitable to support *Microcystis* growth.
116	3.4.4.1	3.4-9			Comment 115 - Algae The Draft EIS/EIR states "This information indicates that the reservoirs provide ideal conditions (see Section 3.4.3.1) for proliferation of blue-green algal species, and serve as a source of algal cells and their toxins to downstream area". The Final EIS/EIR should provide a more balanced discussion that includes acknowledgement that *Microcystis* (and other blue-green algal species) can occur in a variety of settings, including river settings, where conditions are suitable to support their growth.
117	3.4.4.3	3.4-12			The Draft EIS/EIR states "Because Cladophora provide suitable habitat for the polychaete worm that is the intermediate host for fish parasites, the presence of large seasonal periphyton mats immediately downstream of the Hydroelectric Reach have been linked to the potential for increased exposure to and incidence of fish disease". The Final EIS/EIR needs to update this discussion with recent observations from the Klamath Fish Disease Workgroup that polychaetes are also found in high densities in sand/silt habitat and on boulders. Comment 116 - Algae
118	3.4.4.3	3.4-12			The Draft EIS/EIR states "As described above for phytoplankton (i.e., blue-green algae), full and successful implementation of Oregon and California TMDLs would decrease nutrients in the Klamath River and would result in decreased spatial extent, temporal duration, and/or biomass of phytoplankton mats". However, in the next sentences, the Draft EIS/EIR states "the timeframes for achieving water quality objectives with respect to the TMDLs will depend on the measures taken to improve water quality conditions", and then states "It is anticipated that full implementation would require decades to achieve". These three sentences illustrate an important consideration for the Draft EIS/EIR's analysis – that uncertainty is a critical consideration, especially related to the potential for significant water quality improvements given that the main nutrient source of the Klamath River is Upper Klamath Lake, and Upper Klamath Lake is naturally hypereutrophic. Comment 117 - Algae
119	3.4.4.3	3.4-16			The Draft EIS/EIR states "Under the Proposed Action, long-term reductions in the growth of nuisance and/or noxious phytoplankton in the reservoirs in the Hydroelectric Reach would reduce or eliminate the transport of nuisance and/or noxious phytoplankton blooms". However, under existing conditions, backwater areas on the river (e.g., Brown Bear) have had some of the highest *M. aeruginosa* concentrations on the Klamath River. If these areas still contain backwater habitats and have a supply of nutrients and warm temperatures, there is no reason why *M. aeruginosa* will not continue to occur in these areas. Comment 118 - Algae
120	3.4.4.3	3.4-16	Last para.		The back eddy and slack water habitat of the Klamath River have conditions (water temperature, light levels, flow rates, and nutrient availability/ratios) that can produce cyanobacteria and associated

Comment 119 - Algae

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					Comment 119 cont. toxins. This possibility also needs to be discussed in the Draft EIS/EIR.
121	3.4.4.3	3.4-17			The Draft EIS/EIR states "In addition, potential increases in periphyton growth could be counteracted by more frequent river bed turnover (see Section 3.3.4.3) and increased flow variability during storm flow, which could result in increased scouring of periphyton during late spring storm events, following dam removal (NCRWQCB 2010a, Appendix 2)." However, as acknowledged in the Draft EIS/EIR when discussing flood hydrology, the Iron Gate and Copco 1 reservoirs do not dramatically alter the flow regime because they have little active storage capacity. These inconsistent conclusions of the Draft EIS/EIR should be reconciled. Comment 120 - Algae
122	3.4.4.3	3.4-18			The Draft EIS/EIR states "Under the Proposed Action, long-term reductions in the growth of nuisance and nuisance and/or noxious phytoplankton in the Hydroelectric Reach would reduce or eliminate the transport of algal cells and their associated toxins into the Klamath Estuary and would be beneficial". It is unsubstantiated that cyanobacteria (and associated toxins) in the Project reach affect cyanobacteria (and associated toxins) in the Klamath Estuary, some 190 miles downriver. The presence of cyanobacteria (and associated toxins) is directly related to the presence of conditions, such as nutrients, temperature, light, and slow-moving water environments (i.e., pools, backwater eddies, estuaries) that are well known to support cyanobacteria growth. Potentially toxigenic cyanobacteria (like *Microcystis*) are common in rivers and estuaries around the world where conditions are suitable to support cyanobacteria growth. Comment 121 - Algae
123	3.4.4.5	3.4-24		3.4.1	The Draft EIS/EIR states "Dam removal activities could decrease the spatial extent, temporal duration, toxicity, or concentration of nuisance and/or noxious phytoplankton in the area of analysis". However, the "area of analysis" in the above statement refers to the Upper Klamath Basin upstream of the influence of Project reservoirs. Therefore, dam removal, which happens downstream of the area of analysis, would not alter the water quality conditions upstream. Comment 122 - Algae
124	3.5.3.1	3.5-13	1st para.		The statement "The high prevalence of reed canarygrass in this area is a result of current low flows" is oversimplified for the bypass reach. While low flows do expose more historic riverbed for reed canarygrass to colonize, other factors like decreased frequency of high flows that can scour reed canarygrass and reed canarygrass' ability to outcompete other species are also important factors that influence its distribution in the bypass reach. Factors influencing the distribution of reed canarygrass are complex and not fully understood. Comment 123 - Terrestrial
125	3.5.3.4	3.5-22	3rd para.		Editorial - "Tailed frog and southern torrent salamanders were found to be widespread in the lower Klamath River and tributaries (Green Diamond resources Company 2006)." The Final EIS/EIR should

Comment 124 - Terrestrial/Wildlife

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					Comment 124 cont. clarify if tailed frogs/torrent salamanders are found in the mainstem of the lower Klamath River rather than just in tributaries of the Klamath River as described in Table 3.5-4.
		Comment 125 - Terrestrial/WL			
126	3.5.4.3	3.5-59	2nd para.		It is true that after drawdown/removal of reservoirs, reed canarygrass on the shorelines of the reservoirs might die but reed canarygrass would still colonize the shoreline of the newly-formed river. Mitigation measure TER-1 would need to address reed canarygrass expansion.
		Comment 126 - Hydrology			
127	3.6	3.6-1	All		The chapter only assesses flood hydrology and the changes in 100-year flood. A more important impact on hydrology may be the likely change to the low flow hydrology, or changes to geomorphically significant flow.
128	3.6	3.6-19	Lines 24-27		Significance criteria. Document specifies "impacts would be significant if they would substantially increase the risk of..." This is not a quantitative definition for significant. The definition of "significant" could be more precisely worded, to avoid future arguments. Some more quantitative metrics could be: an additional XX structures flooded, a change in water surface elevation of less than XX feet, or additional XX acres inundated, for a particular flood size or recurrence interval.
		Comment 127 - Hydrology			
129	3.10.3	3.10-2 to 3.10-9			Authors have used reasonable references, but not much from California-based studies. Significant portion of the Klamath Basin and two of the dams under are located in California. Authors might consider consulting some of the additional references (see below) which will strengthen the analysis. Maurer, E. P., I. T. Stewart, C. Bonfils, P. B. Duffy, and D. Cayan (2007), Detection, attribution, and sensitivity of trends toward earlier streamflow in the Sierra Nevada, J. Geophys. Res., 112. Cayan, D.R., E.P. Maurer, M.D. Dettinger, M. Tyree and K. Hayhoe (2008), Climate change scenarios for the California region, Climatic Change, 87, (Suppl 1):S21-S42. Stewart, I.T., D.R. Cayan, and M.D. Dettinger (2005) Changes towards earlier streamflow timing across western North America, J. Climate, 18(8), 1136-1155. Hayhoe, K., D.R. Cayan, C.B. Field, P.C. Frumhoff, E.P. Maurer, N.L. Miller, S.C. Moser, S.H. Schneider, K.N. Cahill, E.E. Cleland, L. Dale, R. Drapek, R.M. Hanemann, L.S. Kalkstein, J. Lenihan, C.K. Lunch, R.P. Neilson, S.C. Sheridan, and J.H. Verville (2004) Emissions pathways, climate change, and impacts on California, PNAS,, 101 (34), 12422-12427. Knowles, N., and D.R. Cayan (2004), Elevational dependence of projected hydrologic changes

Comment 128 - GHGs

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					Comment 128 cont. in the San Francisco estuary and watershed, Climatic Change, 62, 319-336. Maurer, E.P. (2007), Uncertainty in hydrologic impacts of climate change in the Sierra Nevada, California under two emissions scenarios, Climatic Change, Vol. 82, No. 3-4, 309-325. Maurer, E.P., L.D. Brekke, and T. Pruitt (2010), Contrasting lumped and distributed hydrology models for estimating climate change impacts on California watersheds, Journal of the American Water Resources Association (JAWRA) 46(5):1024–1035. Dettinger, Cayan, Meyer, and Jeton (2004), Simulated hydrologic responses to climate variations and change in the Merced, Carson, and American Rivers, Sierra Nevada, 1900-2099, Climatic Change 62: 283–317.
130	3.10.3	3.10-5	1st para.		Comment 129 - GHGs The Draft EIS/EIR states "High water temperatures have also been associated with fish kills in the Klamath River downstream of Iron Gate Dam." The Draft EIS/EIR should be revised to state that fish kills have occurred in the Lower Klamath River rather than downstream of Iron Gate dam, which inaccurately portrays that fish kills have occurred disproportionately near Iron Gate dam, or as a result of effects of Iron Gate dam.
131	3.10.4.3	3.10-16	5th para.		Comment 130 - GHGs The Draft EIS/EIR states "The Klamath Hydroelectric Project reservoirs have characteristics that would favor high CH4 emissions". The Final EIS/EIR should provide a basis for the use of the word "high" in this context.
132	3.11.4.3	3.11-20	4th para.	Table 3.11-4	Comment 131 - Geology/Soils The estimate that coarse (0.68 mm) sand is suspended at 3,000 cfs may be in conflict with other studies suggesting other results. The Final EIS/EIR should explain in more detail the basis for this estimate.
133	13.12	3.12-1 to 48	All		Comment 132 - ITAs The entire Tribal Trust chapter is predicated on the assumption that the Klamath Hydroelectric Project is nearly single-handedly adversely affecting fish populations, water quality and other resources important to tribes from Upper Klamath Lake tributaries all the way to the mouth. While the document provides an important Tribal perspective on the role the Project may have played in natural resource conditions and the current tribal way of life, The Draft EIS/EIR lacks any technical analysis supporting many, if not all, of the assertions of Project effects to Tribal resources. The document takes a "broad brush" approach to analysis and fails to present quantifiable data or examine the context of Project effects with those of the larger "industrial economy" - including other resource development and industrialization activities (i.e. other basin dams and other industrialization impacts in the Klamath basin) that may have effects on Tribal resources. Given the lack of technical support for many of the

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					Comment 132 cont. conclusions in this chapter, the document should clearly acknowledge that this chapter reflects Tribal perspectives on resource issues, and does not necessarily represent scientific conclusions regarding Project effects.
134	13.12	3.12-1 to 48	All		Comment 133 - ITAs The Draft EIS/EIR should quantify benefits to tribal trust resources under the 5 alternatives to allow for an evaluation of the tradeoffs associated with each alternative.
135	3.12	3.12-1	3rd para.		Comment 134 - ITAs As described in the comment above, this paragraph makes it clear that the chapter intends to discuss the effects of the Klamath Hydroelectric Project dams, yet the chapter actually describes many broad effects of an industrial economy unrelated to Project effects. This is also a problem within the underlying technical reports used as a basis for this chapter. By contrasting "a salmon based economy" with "an industrial economy (dams)", the chapter portrays that many of the alleged impacts to Tribal resources included in this chapter will be fully addressed or mitigated by removal of hydroelectric dams, despite the fact that other dams will remain, as well as other impacts related to industrialization in the basin.
136	3.12.3.1	3.12-12	3rd para.		Comment 135 - ITAs The Draft EIS/EIR states "the current Klamath River dam operations would have measureable consequences on the condition of lands held in trust status for The Klamath Tribes; consequences which would continue under the No Action/No Project Alternative." The Draft EIS/EIR should be more clear about how current dam operations affect tribal trust lands, and the location of those trust lands.
137	3.12.3.1	3.12-13 and 3.12-15	4th para. and 1st para.		Comment 136 - ITAs The consequences dam removal on access to sacred sites guaranteed under Executive Order 13007 are not discussed, and such a discussion should be incorporated into the Final EIS/EIR. This comment should extend to other tribes as well.
138	3.12.3.3	3.12-19	Last para.		Comment 137 - ITAs A clearer statement on which resources the United States considers to be held in trust for each tribe is warranted. The Final EIS should clarify this point.
139	3.12.3.3	3.12-31	1st para.		Comment 138 - ITAs The Fall Creek Hatchery was constructed by Copco and operated by the California Department of Fish and Game (and its predecessor) to mitigate for fish habitat lost due to the construction of Copco I and II dams.
140	3.13.2	3.13-1	Regulatory Framework		Comment 139 - Cultural Resources Depending on the final ownership and jurisdiction of all lands in the study area, the Archaeological Resource Protection Act (ARPA), ORS 358.905-955, ORS 97.740-760 may also be applicable. Additionally Executive Order 13007 should be addressed in this section (as opposed to the Tribal Trust section), and the implications of the access guarantees under that statute should be addressed in

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					Comment 139 cont. greater detail.
141	3.13.3.1	3.13-13 and 3.13-14	All		The data being used here needs to be updated. There are more recent studies to include. PacifiCorp conducted recent archeological studies in the area as part of Project relicensing studies. Also, there are recent studies in the Lake Britton and Pit River Areas that were conducted for the PG&E Hydro Relicensing. The reports should be on file at the Northeast Information Center in Chico.
142	3.13.4.3	3.13-31			Mitigation may resolve adverse effects under Section 106, but it is unlikely that this action will result in "No adverse effect" under Section 106 given the TCPs and other reported important resources currently under reservoirs. The Final EIS/EIR should clarify the basis for this conclusion. Comment 140 - Cultural Resources
143	3.14.3.1	3.14-10		Figures 3.14-3, 3.14-4, 3.14-6	The map figures do not accurately show PacifiCorp ownership, or Public (USBR) ownership around Keno Dam. The maps in the KHSA should be consulted for current PacifiCorp ownership. Comment 141 - Land Use
144	3.15.3	3.15-3	2nd para.		It is not clear what measure is being used for regional output. Is it total sales? The Final EIS/EIR should clarify this point. Comment 142 - Economics
145	3.15.4.1	3.15-32 to 3.15-34			Clarification is needed regarding the local versus non-local fishing for ocean commercial and recreational fishing in the study area. Are all coastal study area counties (KMZ-OR and KMZ-CA) considered local? Comment 143 - Economics
146	3.15.4.1	3.15-36	3rd para.		It is not clear why there was no attempt to quantitatively estimate the impacts to property values from the changes to the water resources. See for example, Lansford, Notie H., and Lonnie L. Jones. 1995. *Recreational and Aesthetic Value of Water Using Hedonic Price Analysis*. Journal of Agricultural and Resource Economics 20(2):341-355. Comment 144 - Economics
147	3.15.4.1	3.15-37	Last para.		It is not clear why the Draft EIS/EIR assesses economic impacts for the KBRA over the 15 year period - rather than annually. The Final EIS/EIR should clarify why this time period was used. Comment 145 - Economics
148	3.15.4.2	3.15-96		Table 3.15-66	The use of the term "jobs" in this table is misleading because it implies jobs each year for 15 years. Perhaps a better term would be "annual FTEs" or "job-years". Comment 146 - Economics
149	3.15.4.2	3.15-99		Table 3.15-67	This table summarizes only positive effects related to the Proposed Action. There should also be a table that summarizes negative effects as well. Comment 147 - Economics
150	3.16.3.1	3.16-3	Last para.		The Draft EIS/EIR states "Data indicate that any impacts from the Proposed Action and alternatives could disproportionately affect Indian Tribes in the area of analysis". The Final EIS/EIR should clarify

Comment 148 - Envr. Justice

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Num.	Document Section Number	Page Number	Paragraph or Line Number	Figure or Table Number	Comment
					Comment 148 cont. what methodology is being used to arrive at this conclusion.
151	3.16.3.1	3.16-5	1st para.		Comment 149 - NEPA/CEQA The Draft EIS/EIR should first define what's considered disproportionate before stating that "people living below the poverty level are not disproportionately represented ...". Section 3.16.4.1 does not provide a clear definition of disproportionality either. The Final EIS/EIR should clarify how a determination of "disproportionate" is made.
152	3.16.3.2	3.16-10			Comment 150 - NEPA/CEQA The Draft EIS/EIR states "The Klamath River has the third most productive salmon run on the West Coast." This statement should be clarified to say "The Klamath River has the third most productive salmon run on the Oregon and California coasts", consistent with the description in the "Layperson's Guide to the Klamath River". There are multiple salmon runs in Puget Sound (Washington state), British Columbia and Alaska that have salmon populations that are more productive and abundant than the Klamath River.
153	3.16.3.2	3.16-11 to 3.16-12	Last Para. on 3.16-11. 1st para. on 3.16-12.		Comment 151 - Hydrology The Draft EIS/EIR states "Water management, particularly hydroelectric generation, has changed the patterns of water flows throughout the system, affecting the channel geomorphology and spawning and rearing habitat for salmonids, lamprey," This statement is incorrect and not supported by data in the Draft EIS/EIR. This statement is inconsistent with conclusions elsewhere in the Draft EIS/EIR (such as in Chapter 3.6 – Flood Hydrology), which notes that the hydroelectric dams have little influence on hydrology given their minimal storage capacity. Water management effects derive primarily from hydrology changes that result from water management at Upper Klamath Lake, which provides 98 percent of the active storage capacity on the Klamath River. This statement should be corrected in the Final EIS/EIR.
154	3.16.3.2	3.16-11 to 3.16-12	Last Para. on 3.16-11. 1st para. on 3.16-12.		Comment 152 - Envr. Justice The Draft EIS/EIR lacks any scientific analysis of assertions of Project effects to willow shoots. A more appropriate approach to analysis would be to present quantifiable data regarding these assertions and\or examine the context of Project effects with those of other development and processes in the river corridor.
155	3.16.3	3.16-12	4th para.		The Draft EIS/EIR states "The construction of Copco 1 Dam (1918) blocked anadromous fish runs into the Upper Basin and abruptly ended The Klamath Tribes' access to anadromous fish." The Draft EIS/EIR should acknowledge that the Klamathon Dam, which was located below present-day Iron Gate Dam, blocked fish passage between 1889 and 1902, after which the dam was destroyed and that fish passage to the upper basin was then curtailed in 1910 at the same site when the U.S. Bureau of Fisheries installed a fish collection rack at Klamathon.

Comment 153 - ITAs

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156	3.16.3	3.16-14	4th para.		This section of the Draft EIS/EIR states that the water temperature shifts related to the impoundment of water in project reservoirs disrupt salmon spawning cycles and at times produce "stressful or lethal water temperature conditions for aquatic resources" and that release of water impounded in the reservoirs "produces stressful or lethal conditions for aquatic resources". There is no analysis or data presented in the Draft EIS/EIR to support these assertions. Monitoring and modeling of water quality conditions by PacifiCorp as well as the others do not support that such conditions occur, particularly in spring and fall, as incorrectly stated in the Draft EIS/EIR. As with the Tribal Trust section, the Draft EIS/EIR should acknowledge that statements made in this section may reflect a Tribal perspective, but are not necessarily scientific conclusions of the document based on data and analysis. In addition, the Draft EIS/EIS should correctly characterize and differentiate the water quality effects of the four reservoirs, which vary due to differences in reservoir sizes, hydraulic residence times, and inflow conditions. The Final EIS/EIR should correct this section accordingly and include relevant analyses.
157	3.16.3	3.16-15	4th para.		The Draft EIS/EIR states "Downstream from the hydroelectric facilities, water conditions are also ideal for promoting fish disease, in that they allow parasites to thrive. The stable flows and warm water on the Klamath River, especially between Iron Gate Dam and the Shasta River, contain elevated levels of the parasites that carry the fish diseases Parvicapsula minibocornis and Ceratomyxa shasta." This statement should be revised to reflect that uncertainty is very high on factors controlling disease polychaete host abundance and disease infection prevalence in the Klamath River, as has been pointed out by the Klamath River Expert Panel on Chinook Salmon. As reported by Bartholomew (2008, 2009), the main nidus of disease infection in the river downstream of Iron Gate dam is near Beaver Creek, which is nearly 30 miles downstream. As described by Foott et al. (2011), fish disease researchers have been unable to link interannual variability in disease actinospore concentration to factors thought important to disease (e.g., polychaete and spawner abundance) in the Klamath River. Further, Foott et al. (2011) clearly state that there is incomplete understanding of the interaction of environmental factors, such as flow, on the multiple elements of the parasite life cycle, and requires further research to explain disease dynamics in the Klamath River. With regard to the citation in the statement to "California Department of Fish and Game 2004", the statement should be revised to more accurately the findings in the citation. The subject of the citation is the 2002 fish kill that occurred in the lower 36 miles of river, over 150 miles downstream of PacifiCorp's downstream-most facility (Iron Gate dam). Analysis in the citation does not specifically attribute effects from Project facilities on the key factors considered to have caused the fish kill (i.e., low flows, warm water temperatures, pathogens ich and columnaris) that far downstream. As such, the citation contains no evidence that PacifiCorp facilities contributed to this fish kill.

Comment 154 - ITAs

Comment 155 - Fish

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Num.	Document Section Number	Page Number	Paragraph or Line Number	Figure or Table Number	Comment
158	3.16.3	3.16-15	4th para.		The Draft EIS/EIR states "...the Klamath River is widely viewed as inappropriate for these ritual uses because of the effects of the dams on water temperature, algae development, and other variables of water quality (DOI 2011a)." This overstates the effect of the dams as described in the cited underlying report, which states, on page 3-74, "the Klamath River is widely viewed as being of compromised quality for these ritual uses, IN PART, due to the effects of the dams on water temperature, algae development, and other variables of water quality". There is no analysis to support this assertion, and the Final EIS/EIR should be corrected to revise this statement, or to at least more closely track the actual report which attributed these effects only in part to dams.
159	3.16.3	3.16-18	1st para.		In a section discussing the alleged effects of hydroelectric dams on tribal health, the Draft EIS/EIR states: "The Yurok and Hoopa Valley Tribes continue to perform down-river boat ceremonies; however, sometimes the water is so shallow it is necessary to call federal agencies to request water flow increases to perform the ceremony." The Draft EIS/EIR should be revised to clarify that this is not an effect of hydroelectric dams, which do not affect flow volumes in the lower river. Rather, these flows are determined by the Bureau of Reclamation under a Biological Opinion issued by the National Marine Fisheries Service.
160	3.16.3	3.16-20	1st para.		The Draft EIS/EIR states that current dam operations have a range of secondary effects and mentions the closure of the Klamath Tribes' c'waam fishery in 1986. There is no discussion or support for the statement that current operation of the four dams proposed for removal has affects on the c'waam fishery. This statement should be revised in the Final EIS/EIR.
161	3.16.4.1	3.16-24	2nd para.		Although there may not be a standard set of criteria for evaluating environmental justice impacts, most studies use the 1997 CEQ Environmental Justice Guidance Under the National Environmental Policy Act.
162	3.16.4.1	3.16-25	4th para.		The Draft EIS/EIR states that "water quality in the reservoirs and Klamath River would continue to degrade with ongoing operation of the Klamath Hydroelectric Project facilities" but there is no analysis to support this statement. This statement should be revised in the Final EIS/EIR.
163	3.16.4.1	3.16-26	Last Para.		The Draft EIS/EIR states that dam removal would "...help recovery of the endangered sucker fisheries", yet there is no analysis to support this statement. This statement should be revised in the Final EIS/EIR since the dams proposed to be removed are downstream of the historic habitat range of listed suckers and there is no analysis to support the conclusion that removal of these dams would aid in the recovery of suckers.

Comment 156 - ITAs

Comment 157 - ITAs

Comment 158 - ITAs

Comment 159 - Envr. Justice

Comment 160 - Water Quality

Comment 161 - Fish

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164	3.16.4.1	3.16-26	Last Para.		There is no analysis to support the assertion that dam removal would allow tribes to "rely on the river to provide fish for subsistence" or to resume commercial fishing activities.
165	3.16.4.5	3.16-36	4th para.		The Draft EIS/EIR states that "Continued impoundment of water under the Fish Passage at Two Dams, Remove Copco 1 and Iron Gate Alternative would degrade water quality for aquatic species that provide subsistence or commercial fishing revenues for tribes, and would continue to create disproportionate effects and environmental justice concerns on the tribes in the Klamath Basin." However, there is no analysis to support this statement or to support the conclusion that water quality would continue to be degraded under this alternative. This statement should be revised in the Final EIS/EIR to be consistent with conclusions in the water quality section of the Draft EIS/EIR, which state that removal of the two large project reservoirs would address algal concerns and would have temperature effects similar to the Proposed Action.
166	3.17.3	3.17-4 to 3.17-8		Tables 3.17-2 through 3.17-5	Including the year of the data in the title of the tables would be helpful to the reader. As would providing the source of the data at the bottom of the tables. The Environmental Justice section (3.16) does provide the year of the data and the source of the data for each of the tables in the section.
167	3.18.4.3	3.18-16	Last para.		The Draft EIS/EIR states "the flows and ramp rates downstream of J.C. Boyle Dam are still governed by the 2007 environmental measures." It is unclear what the "2007 environmental measures" refers to. The Draft EIS/EIR should be corrected to say that flows and ramp rates downstream of J.C. Boyle dam are still governed by the FERC project license."
168	3.19.3.4	3.19-13	1st para.		Dam removal may increase nuisance periphyton in the hydroelectric reach (see Algae section 3.4.4.3 and Algae ES-23). The Final EIS/EIR should clarify if this will result in negative impacts on scenic quality, water quality, and fish disease issues.
169	3.20.3.1	3.20-7		Tables 3.20-2 and 3.20-3	These "inventory" type summary tables lack the detail needed to assess the availability of substitute recreation opportunities in the region, and this is a critical component in deciding whether changes to Klamath River opportunities are "significant." The Final EIS/EIR should provide such information.
170	3.20.3.1	3.20-8		Table 3.20-4	The information in the list of regional reservoirs lacks detail. Additional information about primary activities and setting class (on the Recreation Opportunity Spectrum) would be most helpful, and some analysis and categorization of the reservoirs most similar to the ones being contemplated for removal is needed. The goal should be to show which substitutes will receive displaced recreation use if the Klamath reservoirs are removed.

Comment 162 - ITAs

Comment 163 - Envr. Justice

Comment 164 - Envr. Justice

Comment 165 - Other/General

Comment 166 - Visual Resources

Comment 167 - Recreation

Comment 168 - Recreaiton

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Num.	Document Section Number	Page Number	Paragraph or Line Number	Figure or Table Number	Comment
171	3.20.4.3	3.20-38	All		Comment 169 - Recreation More detailed consideration of the trade-offs among different types of recreation offered in different alternatives is needed. For example, the person with place attachment to camping and ski boating opportunities on Iron Gate Reservoir is unlikely to be the same person who benefits from new riverside campgrounds along a restored river, and reduced reservoir recreation regionally could produce crowding at the remaining reservoirs. Some more sophisticated accounting of different types of recreation opportunities is needed to assess these losses/gains. Such analysis may also expose more options for mitigation (within the Klamath system, or at some of those substitute reservoir locations). Similarly, the package of recreation mitigation that supposedly includes mitigations along the restored river reaches is not specified (REC-1 is not included in the Table of Contents, in the alternatives chapter, nor in the recreation sections of Chapters 3 or 4).
172	3.20.4.3	3.20-40 to 41	2nd para.		Comment 170 - Recreation The losses of "outstandingly remarkable" whitewater recreation opportunities under dam removal alternatives relative to "no action" are more complicated than a "less than significant" conclusion implies. There are substantial adverse changes in the quality and timing of whitewater in summer months (when most boaters are interested in whitewater) in the Hells Corner Reach, although these are somewhat off-set by new river opportunities that are likely to occur in the existing Boyle Bypass and Copco 2 Bypass reaches, and possibly the new reaches now occupied by Boyle Reservoir, Copco Reservoir, and Iron Gate Reservoir. The Final EIS/EIR should provide more information about those "new" reaches.
173	3.20.4.3	3.20-46	Last para.		Comment 171 - Recreation The Final EIS should incorporate an additional analysis of the improvement in fishing opportunities under different alternatives. The Final EIS/EIR should also specify assumptions for each species, even if it means wide "error" bands for the level of precision.
174	3.21.3.1	3.21-2	3rd para.		Comment 172 - Other/General This paragraph states only J.C. Boyle has an above ground storage tank. To be clear, as the Copco 2 administrative area and the Iron Gate Hatchery have above ground storage tanks.
175	3.21.3.1	3.21-2	Last sentence		The sentence implies the following bulleted items are two of the four sites within the area of interest, but it includes a Highway 66 site which is over 10+ miles away. The Final EIS/EIR should be clarified to explain what the area of interest or affect is supposed to include. Comment 173 - Other/General
176	3.21.3.2	3.21-3			The Draft EIS/EIR states "Tests for lead paint and asbestos are usually performed to characterize material and equipment prior to equipment removal and structure demolition", and then states "As a result, no testing or reporting has been performed since the structures and materials are still in place and the equipment is still in operation". The Final EIS/EIR should clarify that PacifiCorp has tested the

Comment 174 - Other/General

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Num.	Document Section Number	Page Number	Paragraph or Line Number	Figure or Table Number	Comment
					Comment 174 cont. facilities for lead paint and asbestos.
177	3.21.3.3	3.21-5	1st para.		Comment 175 - Other/General The Draft EIS/EIR states "As shown in Figure 3.21-1, the closest existing schools to the area of analysis are Hornbrook Elementary School, Willow Creek Elementary School, Bogus Elementary School, and Keno Elementary". The Final EIS/EIR should clarify that only two of these four listed schools are active. Also, the locations of these schools as shown on the map is inaccurate.
178	4.4.14	4-157	1st para.		Comment 176 - NEPA/CEQA The Draft EIS/EIR concludes that under the cumulative condition, "the Proposed Action would not contribute to long -term employment, income, or output in the regional economy". This conclusion appears to contradict the conclusions released in the "Klamath Regional Economics Fact Sheet" released concurrently with the Draft EIS/EIR. This apparent contradiction should be explained in the Draft EIS/EIR.
179	4.4.14	4-158	3rd para.		Comment 177 - NEPA/CEQA The Draft EIS/EIR incorrectly concludes that population increases over time will offset losses in property tax revenues due to the Proposed Action. The Final EIS/EIR should explain why population increases are independent of the project and if they would occur under No Action.

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180	Appendix C	C-13		C-7	Comment 178 - Water Quality Figure C-7 should be scaled to river mile and rate of removal is not apparent. Abscissa should be re-labeled "Station RM" for clarity.
181	Appendix C	C-14	11		Comment 179 - Water Quality Appendix C states "a relatively small (3.4 percent) fraction of total sediment supplied to the Klamath River on an annual basis originates from the upper and middle Klamath River (i.e., from Keno Dam to the Shasta River) (Stillwater Sciences 2010)..." This statement should be revised to read "a relatively small (3.4 percent) fraction of total sediment supplied to the Klamath River on an annual basis originates as inorganic sediment from the upper and middle Klamath River."
182	Appendix C	C-15			Comment 180 - Water Quality Appendix C states "During the growth season (May–October), suspended materials immediately downstream of Iron Gate Dam are relatively lower than upstream locations, with generally low (<5-8

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Num.	Document Section Number	Page Number	Paragraph or Line Number	Figure or Table Number	Comment
					Comment 180 cont. mg/L) concentrations for 2000-2005 (PacifiCorp 2004a; Raymond 2008, 2009, 2010) (Figure C-7)." Appendix C also states "Between Iron Gate Dam and Seiad Valley (RM 129.4), suspended materials can increase; for example TSS concentrations near the Shasta River confluence (RM 176) for the period 2000-2005 were roughly 1 mg/L greater than those measured further upstream at Iron Gate Dam (Figure C-7), and during 2009 monitoring, TSS ranged 0.87–4.4 mg/L downstream of Iron Gate Dam (RM 190.1), increasing to 2.5-11.5 mg/L downstream of Seiad Valley (RM 129.4) (Watercourse Engineering, Inc. 2011). This pattern may be related to the transport of some portion of the in-reservoir algal blooms to downstream reaches of Klamath River." The first sentence suggests that the dams are retaining some of the sediments. But the second sentence, which is in the same paragraph, seems to suggest that the reservoirs are producing suspended materials that are then carried downstream. These are two contradictory conclusions about the impacts of the dams. The Final EIS/EIR should resolve these inconsistencies.
183	Appendix C	C-17			Comment 181 - Water Quality Appendix C states "Mass wasting, bank erosion, and other natural erosion processes contribute a large portion of the total fine sediment supply to the lower Klamath River, along with management activities such as timber harvest and road construction along tributaries (United States Forest Service 2004, Stillwater Sciences 2010)." The Final EIS/EIR should explain what fraction of the total annual sediment loading into the Klamath River is from these "natural erosion processes".
184	Appendix C	C-19	10		Appendix C states "In the lower estuary, increases in nutrient levels and algae concentrations were correlated with an increase in TSS from 2.2 mg/L on August 21, 2007 to 9.0 mg/L on September 18, 2007, and increases in nutrients, algae levels, and TSS during that period were measured as far upstream as Iron Gate and Copco 1 reservoirs (Asarian et al. 2009)". Appendix C then states "Thus, the observed 2007 increase in estuarine TSS appears to have been influenced by algal growth originating in the two largest reservoirs in the Hydroelectric Reach". The evidence (that nutrients and algal growth increased both in the estuary and in the reservoirs at the same time) has other possible explanations. Algal growth upstream of the reservoirs could be influencing TSS downstream to the estuary, or conditions may have induced algal growth along the entire river at the same time, or conditions in the estuary may lead to increased algae and/or TSS. Further, the travel time between the reservoir and the lower estuary is not mentioned. It takes a number of days to get from below Iron Gate Dam to the estuary, and so increases in nutrient levels at the two locations during the same period may not necessarily correlate. The Final EIS/EIR should recognize that other possible explanations exist. Comment 182 - Water Quality
185	Appendix C	C-23		C-11	In the historic TP chart, the number of samples at each location differs significantly. The low number of samples at the same sites may have been taken at different times during the year, and these low numbers would also skew certain locations relative to others. Therefore, the chart is a poor

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Comment 183 - Water Quality

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					representation of TP data over a time horizon that spans pre-Iron Gate dam and post-Iron Gate dam.
186	Appendix C	C-24	26		Appendix C states "Historical and contemporary nutrient data indicate that, on an annual basis, nutrients in the Hydroelectric Reach tend to be lower than those in the reach from Link River Dam to upstream of J.C. Boyle Reservoir (Figure C-11 through C-13)". The Final EIS/EIR should clarify the extent of nutrient reduction based upon available information including PacifiCorp's water quality modeling from the FERC record as well as Asarian et al. 2010.
187	Appendix C	C-24	39		Appendix C states "Downstream of J.C. Boyle Dam, TN and TP concentrations generally decrease with distance"..." A frequent and notable exception occurs during August–November, when TP concentrations are often higher at Iron Gate Dam than they are at Keno Dam and upstream of Copco 1 Reservoir". TP concentrations below IG are often higher than concentrations above the hydro reach, but TP is not an exception to the statement that concentrations generally decrease with distance downstream in the hydro reach. The Final EIS/EIR should clarify this point.
188	Appendix C	C-28			Appendix C states "While annual data from 2000 through 2004 and early modeling studies by PacifiCorp conducted for the FERC relicensing process indicates that Copco 1 and Iron Gate Reservoirs act primarily as TN and TP sinks due to trapping of algal detritus (PacifiCorp 2004a, FERC 2007), subsequent analyses found that while overall annual retention is likely occurring, the KHP reservoirs can also serve as seasonal sources of TN and TP (though far less for TN than for TP) through the release of nutrients from reservoir sediments into the water column during periods of algal decomposition and seasonal hypolimnetic anoxia, and possibly through direct nitrogen fixation from the atmosphere by cyanobacteria (Kann and Asarian 2005, 2006; Asarian and Kann 2006a, 2006b; Butcher 2008; Asarian et al. 2009, et al. 2010)." This sentence states that the reservoirs act as both a sink and a source of TN and TP. However, the *net* source/sink, which is the more important issue, should be analyzed in more detail. The Final EIS/EIR should provide additional detail to clarify the role of the reservoirs in nutrient reduction.
189	Appendix C	C-28	14		Appendix C states "However, in many years TP concentrations during August through October have been observed to be higher downstream of Iron Gate dam than upstream of Copco 1 reservoir corresponding to peak in-reservoir algal blooms and indicating that some release of TP can occur at times that downstream periphyton growth downstream may be stimulated." This statement is not borne out by Figure C-12, which shows that "TP concentrations during August through October" are almost always lower downstream of Iron Gate dam as compared to upstream of Copco 1 reservoir.

Comment 184 - Water Quality

Comment 185 - Water Quality

Comment 186 - Water Quality

Comment 187 - Water Quality

Comment 188 - Water Quality

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190	Appendix C	C-28	4		Appendix C states "while overall annual retention is likely occurring, the Project reservoirs can also serve as seasonal sources of TN and TP (though far less for TN than for TP)". This presentation over-emphasizes the seasonal influence of the reservoirs on nutrient concentrations downstream. The number of times that reservoirs have been observed to be seasonal sources of TN and TP is few. These times should be quantified along with the relative increase and error associated with it, which may be insignificant. The averaging period of this data driven analysis is sufficiently long that it does not actually represent month-to-month variability. The river travel time between Keno dam and Iron Gate dam is more than 40 days. The hydropower reservoirs' hydraulic residence time diminishes peak loads originating in the upper basin and delays loads by several weeks. Peak late summer and fall loads conveyed downstream by the Klamath River are effectively shifted to mid-late fall, which is out of the peak primary production periods due to shorter day length in that period.
191	Appendix C	C-29	9		Appendix C states "Concentrations of orthophosphate are generally constant throughout the water column in winter months when the reservoirs are mixed, while in stratified periods (i.e., May–October/November) vertical concentration gradients develop in Copco 1 and Iron Gate reservoirs (Raymond 2008, 2009, 2010). For example, concentrations near the bottom of Copco 1 reservoir reached 1.4 mg/L in September and October of 2008 and 2009, while in Iron Gate reservoir they remained below 0.5 mg/L throughout the water column." The Final EIS/EIR should provide information to support this assertion.
192	Appendix C	C-29	30		Appendix C states "anoxic conditions are likely causing conversion of organic nitrogen in reservoir deposits to ammonia and introducing the potential for episodic in-reservoir toxicity events depending upon reservoir mixing conditions". This is a speculative statement. There is no evidence that ammonia toxicity has occurred in Copco or Iron Gate reservoirs. Further, this statement directly contradicts what is stated in section 3.2.4.2.2.4: "... available data collected to date suggests no actual ammonia toxicity events associated with the operation of the Four Facilities (NCRWQCB 2010a)..." (page 3.2-46). Kann and Asarian (2005, 2007) also note that "only minor increases in ammonia (0.05–0.1 mg/L) have been observed to occur in Copco 1 and Iron Gate Reservoirs, most often during October and November".
193	Appendix C	C-30	11		Appendix C states "recent data indicate that phosphorus dynamics in the Klamath River immediately downstream of Iron Gate Dam are affected by conditions within the Project reservoirs". The Final EIS/EIR should include a discussion of how changed phosphorus dynamics affects algal growth downstream since Project reservoirs may improve conditions and restrict growth downstream by delaying the period of maximum TP concentration in the river to a time period less favorable to algae growth.

Comment 189 - Water Quality

Comment 190 - Water Quality

Comment 191 - Algae

Comment 192 - Water Quality

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194	Appendix C	C-32			Comment 193 - Water Quality The discussion on this page of nutrient retention downstream of Iron Gate dam is much more extensive than the discussion of nutrient retention by dams (one sentence on page C-28). This may give the false impression that more nutrient retention happens along the Klamath River below Iron Gate dam where there are no impoundments. The Final EIS/EIR should provide a more detailed explanation of nutrient retention in Project reservoirs.
195	Appendix C	C-33	25 and 32		Comment 194 - Water Quality Appendix C states "The Asarian et al. (2010) analysis suggests that while nitrogen and phosphorus are largely being removed from the river upstream of the Trinity River confluence (RM 42.5) during the June–October and July–September study periods, downstream of the confluence, nutrients are being added." There is a contradiction here because in the next paragraph the report says that nutrient levels are lower at Turwar than upstream of the confluence with the Trinity River: "In general, nutrient levels in the Klamath River Estuary are lower than in the Klamath River just upstream of the Trinity River confluence (RM 43.5) and comparable to the nearest river sampling station (RM 5) near Turwar". The Final EIS/EIR should resolve this conflict.
196	Appendix C	C-41			Comment 195 - Water Quality Appendix C states "The percent of dissolved oxygen measurements below 8 mg/L decreases with distance downstream, particularly in 2005 and 2006" and then states "Table C-2 summarizes dissolved oxygen concentrations in the Lower Klamath River during Summer 2004-2006". It is not clear if the 8 mg/l DO objective is based on an hourly metric or a daily metric or something else. The Final EIS/EIR should clarify why 2004-2006 was chosen to represent the DO conditions in this reach.
197	Appendix C	C-44	21 and 25		Comment 196 - Water Quality Discussion in this paragraph compares some dissolved oxygen values to "8 mg/L (the Basin Plan minimum dissolved oxygen criterion prior to 2010)" and some values to "2010 amended Basin Plan minimum dissolved oxygen concentration criteria based on percent saturation (e.g., 7.0, 6.9, and 7.8 mg/L for July, August, and September, respectively, see Section 3.2, Table 3.2-5)." The Final EIS/EIR should provide a more consistent comparison of these points.
198	Appendix C	C-47	7 and 40		Comment 197 - Water Quality On this page, Appendix C discusses values of pH collected in Keno reservoir and downstream at Miller Island. The Final EIS/EIR should clarify that these data are upstream from, and therefore not influenced by, conditions in the Project area.
199	Appendix C	C-48		C-20	Comment 198 - Water Quality It is unclear if appropriate calculations were made concerning average pH. The value of pH is equal to the log of hydrogen ion concentrations, and so "average pH" is not simply calculated by taking an average of two pH values. The correct calculation of the average pH is to take the inverse log of the pH values, average them, and then take the logarithm. The Final EIS/EIR should correct these calculations.

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200	Appendix C	C-56	18		Comment 199 - Water Quality Appendix C states "median chlorophyll-*a* concentrations within Copco 1 and Iron Gate Reservoirs are 2 to 10 times greater (note the logarithmic scale in Figure C-28) than those documented in free-flowing locations in the mainstem river". Figure 28 shows that above JC Boyle and below Iron Gate at I-5 sites exhibit very similar median chlorophyll-a values. From the figure, it appears that the hydroelectric reach has little net affect on median chlorophyll-a values. The Final EIS/EIR should clarify this point.
201	Appendix C	C-59	3		Comment 200 - Water Quality Appendix C states "As discussed above (Section C.6.1.4), 2005–2007 data indicate that during May through September median chlorophyll-*a* concentrations decreased longitudinally with distance downstream of Iron Gate Dam (Figure C-28) and were greater than concentrations measured just upstream of Copco 1 Reservoir". From Figure C-28, it appears that the hydroelectric reach has little net affect on median chlorophyll-a values. Sampling above Copco 1 reservoir is subject to peaking flows, i.e., flows when hydropeaking is offline consist of largely flows from the natural springs in the J.C. Boyle bypass reach, flows under full peaking (when they reach the above Copco 1 sampling site) are dominated by J.C. Boyle waters, and during intermediate periods are intermediate between the two (see Asarian et al. 2009). The Final EIS/EIR should clarify this point.
202	Appendix C	C-60	8		Comment 201 - Water Quality Appendix C states "WHO guidelines for exposure to microcystin (i.e., < 4 µg/L) have been exceeded downstream of Iron Gate Dam on numerous occasions". This appears in conflict with data presented. Figure C-32 appears to show only a few exceedances below Iron Gate. The Final EIS/EIR should present an exceedance plot of all data to clearly indicate exceedances.
203	Appendix C	C-62	38		Comment 202 - Water Quality Appendix C states "These elevated levels of *M. aeruginosa* corresponded with elevated levels measured farther upstream in Copco 1 and Iron Gate Reservoirs, indicating that *M. aeruginosa* was being transported into the estuary from upstream reservoir blooms (Kann and Corum 2006)." The Final EIS/EIR should describe that the presence of *M. aeruginosa* is directly related to the presence of conditions, such as nutrients, temperature, light, and the slow-moving water environment. The Final EIS/EIR should also provide a more balanced discussion that includes acknowledgement that *Microcystis* is common in rivers and estuaries around the world where conditions are suitable to support *Microcystis* growth.
204	Appendix D	D-2			Comment 203 - Water Quality The text states "The Klamath TMDL model was calibrated for water temperature, dissolved oxygen, nutrients (TP, TN, ortho-phosphorus, nitrate, ammonia), and pH using year 2000 data, with the exception of the estuary segment which was calibrated using year 2004 data", and further states "Additional model corroboration was conducted for model segments 1 through 5 (within Oregon) using data from year 2002, indicating that the Klamath TMDL model scenarios reproduce general temporal and spatial trends in the observed data (Tetra Tech 2009a)". Running the model for one year

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					Comment 203 cont. does not usually constitute adequate model calibration. Also, downstream segments are not validated by 2002 data. (See PacifiCorp TMDL comments, PacifiCorp [2009] and PacifiCorp [2010]). This point should be clarified in the Final EIS/EIR.
205	Appendix D	D-3		D-1	Comment 204 - Water Quality The Final EIS/EIR should clarify which KRWQM scenarios were used, just as Klamath TMDL model scenarios are listed.
206	Appendix D	D-5 to D-6		D-2	Comment 205 - Water Quality The Final EIS/EIR should identify years used as "existing conditions" for flows under Klamath TMDL scenarios just as flows under KRWQM scenarios are identified as "2000-2004." Also, "Current conditions" and "Algal Settling Rate" for "Algae and POM" under KRWQM should not be footnoted. These footnotes (4 and 6) do not apply to KRWQM scenarios.
207	Appendix D	D-7	15		Comment 206 - Water Quality The text states "As presented in Table D-2, major differences between the existing numeric models and the conditions considered for the Klamath Facilities Removal EIS/EIR water quality analyses include the following:". The list of "major differences" between KRWQM and Klamath TMDL should include: significant difference in calculating solar radiation; significant modifications to model code and recalibration; and significantly different nutrient and OM boundary conditions assumed at Link River dam.
208	Assess. of Long Term WQ Changes	Entire report			Comment 207 - Water Quality PacifiCorp notes that this report describes long-term water quality responses for different alternatives that are dependent on highly uncertain TMDL scenarios, modeling, and implementation efforts. PacifiCorp has documented substantial flaws in the Klamath River TMDL, which PacifiCorp has documented previously in its comments on the TMDL. In addition, this report assumes that TMDLs are reasonably certain to be achieved. There have been substantial technical critiques of these TMDLs, including information indicating the TMDLs are unrealistic and unattainable. Independent assessments of conditions for anadromous fish in the Klamath Basin by the National Research Council (NRC 2004, NRC 2008) and the Klamath River Expert Panels (Dunne et al. 2011, Goodman et al. 2011), although not referring to the TMDLs specifically, indicate that very substantial water quality improvements in the Klamath Basin, such as assumed in the TMDLs, are unrealistic or at best highly uncertain. PacifiCorp does not endorse nor agree with representations made in this report regarding long-term water quality improvements that may result from TMDL implementation efforts. PacifiCorp's views on these issues are included in its comments on the Klamath River TMDL. (See PacifiCorp TMDL comments, PacifiCorp [2009] and PacifiCorp [2010]).
209	Assess. of Long Term	3			Comment 208 - Water Quality The report states "Additional water quality impairments that threaten Coho include: increased water temperature, altered seasonal temperature patterns, reduced dissolved oxygen, elevated nutrient

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Num.	Document Section Number	Page Number	Paragraph or Line Number	Figure or Table Number	Comment
	WQ Changes				Comment 208 cont. loading, exposure to algal toxins, pH levels outside of optimal ranges, and increased turbidity". This list of water quality impairments include several naturally occurring processes. For example, water temperatures throughout the study area are naturally elevated during the warmer seasons of the year. Releases from Iron Gate dam are cooler in spring and warmer in fall (according to the Draft EIS/EIR). Coho salmon immigration usually utilizes the Klamath River from late November through December - a period when impacts of the reservoir on water temperatures are not an issue. Throughout late spring into fall, much of the river system is naturally warm - warmer than desirable for coho salmon. Elevated nutrient loading is a problem in the Klamath River basin, but a large portion of this is due to: (1) naturally-eutrophic condition of Upper Klamath Lake and headwater streams; (2) geologic nutrient sources in the large spring driven reaches (and tributaries); and (3) internal nutrient cycling within the river system in response to the previous two points. However, these nutrients also allow fish (e.g., increased ration) to survive in the naturally warmer water temperatures of the Klamath River. Finally, pH in this system is largely controlled by primary production and the fact that the system is weakly buffered due to basin geology. Even a fraction of the current primary production in the river reaches will lead to pH excursions near or above 8.5 to 9 pH units (above basin plan objectives). That is, this is a largely naturally occurring condition. It is also important to note that algal toxins are present in Upper Klamath Lake. Microcystis, Anabaena, and other cyanobacteria common to or found in Upper Klamath Lake are among the toxin-producing species of concern. The Final EIS/EIR should explain in more detail the occurrence of these naturally-occurring conditions, and clarify the points raised above.
210	Assess. of Long Term WQ Changes			Appendix Table 1	Comment 209 - Water Quality Appendix Table 1 should be revised to reflect that Interim Measure 3, Iron Gate Turbine Venting, has been shown to be effective in elevating dissolved oxygen levels below Iron Gate dam. Please see PacifiCorp's technical memorandum regarding the effectiveness of turbine venting (PacifiCorp 2011b). Similarly, Interim Measure 5, Iron Gate Flow Variability, is being implemented on an ongoing basis, with demonstrable impacts to flow releases below Iron Gate dam. These changes should be reflected in the table as well as in the report, and the Final EIS/EIR should be consistent with these changes.
211	Barth. and Foott (2010) Disease Report	2			Comment 210 - Fish The report states "In reservoirs and Klamath Lake, M. speciosa was consistently present at the riverine inflow areas (lotic-lentic interface) at moderate (804/m2) to high (16,054/m2)". However, on page 18 the report notes that "low" is defined as ranging from 500 to 2.5 million per square meter. These statements should be clarified.
212	Barth. and Foott (2010) Disease	14			The report states "This suggests that fish migrating longer distances in the mainstem river are subject to greater selection pressure by the parasite". The Final EIS/EIR should assess if fish originating from above the Keno reach may be subject to increased mortality given the increased duration of exposure

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	Report				to disease parasites.
213	Barth. and Foott (2010) Disease Report	18			The report indicates that sediment effects under the different alternatives will be most significant near Iron Gate dam but will decrease significantly by Beaver Creek. The Final EIS/EIR should clarify how (e.g. by what mechanism) the changes in sediment effects under the different alternatives will result in a reduction in disease incidence in the Klamath River.
214	Barth. and Foott (2010) Disease Report	20			The report discusses how recolonization by the parasite is likely to occur rapidly following dam removal and how growth rates for M. speciosa may be enhanced by increased sediment load. On page 22, the report states "Polychaete populations were always located outside of the main flow along the margins of the riverbanks and most often within protective structures such as a bedrock ledge or boulder out-crops". The Final EIS/EIR should clarify how the flow and sediment regime under different alternatives will influence these microhabitats for the polychaete worm and result in changes to the incidence of fish disease.
215	Barth. and Foott (2010) Disease Report	36			The report states "Earlier warming will likely result in earlier reproductive activity of the polychaete and more rapid colonization, potentially increasing and prolonging the period of actinospore release in spring". This would result in a longer exposure time for juvenile migrants as well as increased mortality due to higher stream temperatures. The analysis of alternatives in the Final EIS/EIR should more fully reflect this conclusion.
216	Barth. and Foott (2010) Disease Report	40			The report states "A lower infectious dose may be especially critical for those fish migrating further distances upriver, and which will be more vulnerable to the effects of disease". The Final EIS/EIR should assess whether this conclusion affects the assumptions about the impacts of fish disease.
217	Barth. and Foott (2010) Disease Report	41			The report states "...if the current infectious zone is not altered following dam removal, it is likely that with longer migration distances from these upriver rearing areas, fish will be migrating through this zone throughout the period when temperatures are high". The Final EIS/EIR should explain how the infectious zone will change under the different alternatives, by what mechanism, and should discuss the uncertainty related to achieving these changed conditions.
218	Barth. and Foott (2010) Disease Report	42			The report states "Thus high infection prevalence in adult fish will likely be maintained even if C. shasta levels are reduced in the infectious zone", and further states "It could be expected that prespawn mortality as a result of myxozoan infection will be increased for fish migrating further in the mainstem KR". This important observation should be included in the Final EIS/EIR.

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219	Barth. and Foott (2010) Disease Report	43			The report states that "... a low number of infected adult salmon (>3000) are sufficient to maintain high infection prevalence in polychaetes". The Final EIS/EIR should reconcile this statement with the analysis in Chapter 3 of how spawning density (described in the Draft EIS/EIR as "crowding") is relevant to fish disease in the Klamath River.
220	Barth. and Foott (2010) Disease Report	45			In Section 7.3, Assessment of Effects of Dam Removal on Altered Adult Distribution and Disease, the report acknowledges that there is the potential for increased dispersal of myxospores as adult salmon migrate into new habitats. The authors state that there is a great deal of uncertainty with these predictions and state that the creation of an infectious zone in the Williamson River as a result of stocking susceptible hatchery rainbow trout might provide insight as to what might be expected to occur. However, no hypothesis for what might be expected to occur is presented. The Final EIS/EIR should discuss possible outcomes given the example cited.
221	Barth. and Foott (2010) Disease Report	49			The report states that "...it is likely that dam removal, by reducing nutrients, will result in some reduction in polychaete densities". The Draft DES/EIR (page 3.2-60), PacifiCorp (2006), and Asarian et al. (2010) provide evidence that the Project reservoirs retain nutrients on an annual basis. The report should be corrected to properly reflect the nutrient retention dynamics of Project reservoirs, and any conclusions in the Final EIS/EIR relying upon this report in this regard should be corrected.
222	Hendrix (2011) Fish Modeling Report	2			The report indicates that median escapements and harvest were higher in DRA relative to NAA with a high degree of overlap in 95% confidence intervals due to uncertainty in stock-recruitment dynamics. The Final EIS/EIR should explain whether such results are statistically meaningful, and what conditions caused 25 percent of the model runs to result in lower Chinook production with the dams out.
223	Hendrix (2011) Fish Modeling Report	2			The report indicates that the median increase in escapement in the absence of fishing was 81.4% (95% symmetric probability interval [95%CrI]: -59.9%, 881.4%). The basis for using the median increase should be explained in more detail in the Final EIS/EIR.
224	Hendrix (2011) Fish Modeling Report	4			The report states "A meta-analysis of stock-recruitment for Chinook populations throughout the western U.S. and Canada by Liermann et al. (2010) provide valuable insight into Chinook population dynamics". The Final EIS/EIR should explain how studies contained in Liermann are relevant to the Klamath River, as well as any differences that may influence results.
225	Hendrix (2011) Fish	4			The Final EIS/EIR should discuss and evaluate other factors unique to the Upper Klamath basin beyond those considered by Liermann (2010). For example, there is the prominence in the Upper Klamath

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	Modeling Report				Comment 223 cont. basin of the large Upper Klamath Lake. The presence of this large lake may affect population productivity.
226	Hendrix (2011) Fish Modeling Report	4			Comment 224 – Fish The report indicates that modeling was done outside the range of the data used to construct the model. Hendrix (2011) uses the model to evaluate streams (Upper Klamath basin) with physical parameters (e.g., elevation, stream discharge) different than what was used to construct the Liermann model in the first place (i.e. none of the streams modeled in Liermann have characteristics similar to the Upper Klamath River). The Final EIS/EIR should clarify whether unique habitat conditions in the Upper Basin may affect the approach used by Liermann for modeling fish production.
227	Hendrix (2011) Fish Modeling Report	4			Comment 225 - Fish The proposed modeling approach suggests that KBRA actions will improve population productivity. The Final EIS/EIR should explain from what level productivity will be improved.
228	Hendrix (2011) Fish Modeling Report	5			Comment 226 - Fish The Final EIS/EIR should explain in more detail if the recruitment model considered hatchery fish spawning naturally as production, and how the closure of Iron Gate hatchery may affect the number of fish spawning naturally in the future.
229	Hendrix (2011) Fish Modeling Report	9			Comment 227 - Fish The report refers to the "vector of proportions of the natural origin consisting of: age 3 natural proportion, age 4 natural proportion, and age 5 natural proportion". The model should report the number of hatchery fish returning to hatcheries (Trinity and Iron Gate hatcheries) and the number of hatchery-origin (HOR) fish spawning naturally. The Final EIS/EIR should explain what happens to these hatchery fish upon their return to the basin, and how such results are used in the model.
230	Hendrix (2011) Fish Modeling Report	9			Comment 228 - Fish The report states "In each year the hatchery was operational, the Trinity River Hatchery produced 3 million and the Iron Gate Hatchery produced 6 million fingerlings." The author should confirm the size of the fish released from each hatchery and their survival rates. It is PacifiCorp's understanding that both hatcheries release approximately 1.0 million fall Chinook yearlings in October/November that have 2-3 times the survival rate of the sub-yearling releases. If this is the case then the report should either 1) be revised to account for these fish or 2) explain how not including them affects study assumptions (e.g., flow benefits), results and conclusions (especially percent change in key parameters).
231	Hendrix (2011) Fish	11			The report states "Both stream and ocean type Chinook are expected to be present in the tributaries to UKL (Dunsmoor and Huntington 2006); therefore, the production functions for the tributaries to UKL

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	Modeling Report				Comment 229 cont. incorporated productivity (r) and unfished equilibrium population size (E) for a mixture of stream and ocean Chinook". The analysis assumes that both life history types are fall Chinook and not spring Chinook. However, fish production in the upper basin is expected to have a large spring Chinook component according to the Draft EIS/EIR. Assumptions regarding harvest, escapement levels and fishery closures applied to fall Chinook would not be applicable for spring Chinook. The report should provide results consistent with Draft EIS/EIR assumptions.
232	Hendrix (2011) Fish Modeling Report	12			Comment 230 - Fish The report states "From Iron Gate Dam to Keno Dam, the mainstem and tributaries to the mainstem (Spencer, Shovel, Jenny, and Fall creeks) watershed area was estimated at 1792.2 km2 (Lindley and Davis In prep)". The Final EIS/EIR should clarify if known obstructions in Jenny, Fall, Shovel and Spencer were incorporated into this estimate.
233	Hendrix (2011) Fish Modeling Report	12			Comment 231 - Fish The final fish modeling report should provide annual estimates of escapement to areas above Keno Dam. The current draft provides no information on expected run-size to this portion of the basin.
234	Hendrix (2011) Fish Modeling Report	13			Comment 232 - Fish The report indicates that the improvement in productivity due to KBRA actions in EDRRA was represented by drawing samples from a truncated distribution of productivity. The report further indicates that, by using a truncated distribution, the upper range of productivity values did not change, whereas the lower values of productivity became less likely over time. The final report should: (1) explain the rationale for removing the lower 25 percent; (2) present the productivity values obtained using this analytical approach; and (3) provide a more detailed comparison of those values to those observed in other Chinook bearing rivers. The report would be much more understandable to the public if tables showing all results by year were included as an appendix.
235	Hendrix (2011) Fish Modeling Report	13			Comment 233 - Fish The assumptions used in modeling KBRA actions for the fish production modeling should be reviewed with those included and described in the Draft EIS/EIR. It appears that the production function for the lower river includes fish spawning in the Trinity River, yet KBRA actions are not targeted to this basin.
236	Hendrix (2011) Fish Modeling Report	14			Comment 234 - Fish The report states that "the fishery management is the same for DRA and NAA" and indicates it is fixed for the time period of the model simulations. The Final EIS/EIR should clarify how the harvest analysis was performed for the fish returning to the Upper Klamath River. This population has a lower productivity value than the lower river population so harvest levels for one may not be applicable to the other.

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237	Hendrix (2011) Fish Modeling Report	16			The report states "The Liermann et al. (2010) model was also calculated for the lower basin assuming a watershed area of 9,653 km2 (assuming a total watershed area of 12,066 km^2 for the Salmon, Shasta, Scott, and Lower Klamath below Iron Gate and removing 20% due to watershed area draining directly into anadromous streams, D. Chow, NMFS, pers. comm.)". The report then compares model results to empirical estimates in STT (2005) to demonstrate similarity in outcomes regarding fish production. The modelers should check to see if they are modeling the same portion of the basin as STT (2005). It appears that STT (2005) estimates included the Trinity River while the Liermann model results presented in the report do not. If this is the case, then the comparison should be redone using similar assumptions. (See Parken et al 2006 for STT assumptions).
238	Hendrix (2011) Fish Modeling Report	16			The report states "Under DRA the spawning habitat was increased by 1790 km^2, which equated to an adult unfished equilibrium population size of 23,613 (95% CrI: 11,063.1; 47,625.1) (Liermann et al. 2010)". The Final EIS/EIR should clarify if the analysis accounts for habitat barriers in this portion of the basin.
239	Hendrix (2011) Fish Modeling Report	17			The report states "Over these three periods, the median percentage increases in escapement to the lower basin in DRA relative to NAA were approximately 7% to 9% after 2021 (Table 8)". The Final EIS/EIR should clarify if these numbers are affected by potential changes in hatchery production that contribute to natural production. Also, all fish returning to the basin (hatchery and natural) should be included in the estimates.
240	Hendrix (2011) Fish Modeling Report	17			The report states "Escapement in the absence of fishing was calculated by the KHRM prior to determining the harvest rate, and it provided an estimate of total escapement to the Klamath Basin". The Final EIS/EIR should explain in more detail whether these results may overestimate harvest benefits in some fisheries and underestimate them in others since this methodology assumes perfect harvest management.
241	Hendrix (2011) Fish Modeling Report	17			The report states "The probability is 0.79 from 2021-2032 and 0.78 from 2033 to 2061 that forecasted escapement under DRA was higher than NAA (Figure 13)". The numbers behind these estimates should be disclosed and rationale for their use explained in more detail in the Final EIS/EIR. The analysis should make it clear that the increase is to natural spawning areas and does not include returns to hatcheries. In addition, the Final EIS/EIR should clarify impacts to results if fish abundance levels occur later than envisioned.
242	Hendrix (2011) Fish	17			The report states "the probability of DRA being greater than NAA was 0.54 and 0.56 for the periods 2021-2032 and 2033-2061, respectively (Figure 14)". Uncertainties surrounding these estimates should

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	Modeling Report				be more fully explained in the Final EIS/EIR. Also, the effect harvest policy has on these values should also be clarified.
243	Hendrix (2011) Fish Modeling Report	18			The report states "This rule is based on an optimal (i.e., escapement that produces maximum sustainable yield) escapement target after harvest of 40,700 (STT 2005)". The analysis uses the same escapement target for both alternatives (40,700) despite the fact that basin spawning distribution has been extended by an assumed 420 miles. Given this increased distribution to areas with lower capacity and productivity, it seems highly likely that escapement levels would need to increase to initially seed and maintain upper basin Chinook production. Given the 50 percent difference in productivity between the Upper and Lower basin, it would seem the harvest rate (rate at maximum sustainable yield [MSY]) used in the analysis for the lower basin would need to be adjusted to provide for reintroduction. The Final EIS/EIR should clarify if this point has been taken into account. Comment 241 - Fish
244	Hendrix (2011) Fish Modeling Report	18			The report concludes "there may be a trade-off between higher probability of closures and higher harvest rates that would need to be explored based on the spawner recruitment relationships for the lower and upper basins". This statement implies that the production functions for the upper basin and lower are different and would affect harvest rates. The Final EIS/EIR should clarify how harvest was determined and how it affected spawning escapement. Comment 242 - Fish
245	Hendrix (2011) Fish Modeling Report	18			The report states "Second, the probability of fishery closure was determined by F control rule and its escapement floor". The Final EIS/EIR should present a more detailed discussion of fishery closures that are Included in assumptions, and limitations regarding such assumptions (e.g. the model assumes all fish are fall Chinook salmon). Comment 243 - Fish
246	Indian Trust Technical Report (Gates and Novell 2011)	1-8	Last sentence		The document states "Although not all factors related to a compromised river environment can be attributed to the PacifiCorp dams, the dams' effects certainly contributed to the 2002 fish kill". There is no evidence that PacifiCorp facilities contributed to this fish kill. The fish kill occurred in the lower 36 miles of river, over 150 miles downstream of Iron Gate dam, PacifiCorp's most downstream dam. Analysis by the California Department of Fish and Game (September 2002 Klamath River Fish-Kill: Final Analysis of Contributing Factors and Impacts, July 2004) bears this out and there were no effects attributed to Project facilities on the key factors considered to have caused the fish kill (i.e., low flows, warm water temperatures, pathogens ich and columnaris) that far downstream. The Draft EIS/EIR should clarify that PacifiCorp's hydroelectric project has not been identified as a contributing factor to that event by any scientific studies conducted concerning the situation. Comment 244 - ITAs

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247	Indian Trust Technical Report (Gates and Novell 2011)	3-11		Table 3-1	Comment 245 - ITAs This document uses tables and conclusions from the dams-in sections of the document titled *"Potential Effects of Implementing the KHSA and KBRA on Indian Trust Resources and Cultural Values"* (North State Resources 2011). This document does not separate out the effects from PacifiCorp's dams (which have a minimal effect on flows in the river) and Reclamation's Link River Dam, which controls releases from Upper Klamath Lake that affect flow volumes downriver. Since the title of this document is "Current Effects of PacifiCorp Dams on Indian Trust Resources and Cultural Values (North State Resources 2011)", it is important to separate out the effects from PacifiCorp's dams and the Klamath Irrigation Project.
248	Indian Trust Technical Report (Gates and Novell 2011)	3-11 to 3-28		Tables 3-1, 3-3, and 3-5	Comment 246 - ITAs Another commonly-listed effect of current dam operations on water resources for all tribes is "Reduced bedload/sediment transfer." A general footnote for all effects in the table says that "These effects are muted by the time the water reaches the reservation, but more severe effects on upstream reaches affect fish populations used by the Yurok". However, for downstream tribes, the effect of the hydro project dams on sediment probably does not extend much further downstream than the Shasta River (see PacifiCorp [2004] Water Resources Technical Report chapter on geomorphology). The FERC (2007) Final EIS further concludes that Project-related sediment effects almost certainly do not persist downstream of the Scott River because the Scott River watershed contributes more sediment than the entire Klamath River upstream of that confluence (see Final EIS volume 1, p. 3-49). The analysis sections that address Suspended and Bedload Sediment in the report (page 3-6 and other similar sections) should include this information.
249	Indian Trust Technical Report (Gates and Novell 2011)	3-11 to 3-53		Tables 3-1, 3-3, 3-5, and 3-7	Comment 247 - ITAs "Altered flows" is a commonly-listed effect attributed to the hydro projects. Although flows have been altered by hydro project operations between JC Boyle and Iron Gate dams, flows downstream of Iron Gate dam are largely influenced by the irrigation project so the related effects should not all be attributed to the hydro project. The analysis sections on Altered Flows should discuss this point in more detail.
250	Indian Trust Technical Report (Gates and Novell 2011)	3-11 to 3-54		Tables 3-1 to 3-8	The document uses a set of two tables per tribe; one summarizing the effects of Project operations on tribal trust resources and another summarizing effects on cultural values. The lists of effects of Project operations on tribal trust resources are similar among tables for each Tribe. However, for the tables listing the effects on cultural values, there are different effects listed for the different tribes. These effects do not appear supported by the analysis provided, and the Final EIS/EIR should remedy this situation. Some of the effects listed in the tables are only partly attributable to the hydroelectric project. For example, effects from "altered flows" are attributable predominantly to the upstream irrigation project. Other effects like "reduced bedload/sediment transfer" may not affect the tribal

Comment 248 - ITAs

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Num.	Document Section Number	Page Number	Paragraph or Line Number	Figure or Table Number	Comment
					Comment 248 cont. lands that are downstream of the Project area, since the Project's effect of reduced sediment does not extend much further downstream that the Shasta River (see PacifiCorp [2004] Water Resources Technical Report chapter on geomorphology).
					Comment 249 - ITAs
251	Indian Trust Technical Report (Gates and Novell 2011)	3-44			The document states "The dam causes the river to be extremely stable, meaning the water does not scour the surfaces", and then states "As a result, all the nutrients in the reservoir pass over the dam and provide a food source for these parasitic worms to thrive in the stable environment below the dam". The authors should refer to the PacifiCorp (2004) Water Resources Technical Report (Hydrology chapter), the FERC (2007) Final EIS on Project relicensing. The authors should refer to the PacifiCorp (2006) report "Causes and Effects of Nutrient Conditions in the Upper Klamath River", the FERC (2007) Final EIS on Project relicensing, and Asarian et al. (2010) for information on Project effects on nutrients, which all describe that the Project reservoirs cause a net annual *decrease* in nutrients due to retention. PacifiCorp observes that, the stability of river flows in the Klamath River below Iron Gate Dam is not a function of hydroelectric dam operations, but instead is due to river management decisions made by the U.S. Bureau of Reclamation's Klamath Project. Reclamation's project operations and flow releases at Link River Dam dictate flow releases at Iron Gate dam. This point should be reflected in the Final EIS/EIR.
					Comment 250 - ITAs
252	Indian Trust Technical Report (Gates and Novell 2011)	3-45			The document states "the reservoirs behind the dams are maturing and problems relating to fish diseases are multiplying". The Final EIS/EIR should provide more data and analysis supporting this statement. Also, the Final EIS/EIR should present an analysis and scientific information supporting the statement that "Removal of Iron Gate Dam will increase the scouring effect". Furthermore, the document's statement that removal of Iron Gate dam will "lower the temperature in the upper river" is correct only during late summer and fall. Available information indicates that the dams reduce maximum daily temperatures in the upper river in spring and much of the summer (see PacifiCorp [2004] Water Resources Final Technical Report; and FERC [2007] Final EIS).
253	Hydropower Benefits Technical Report	12	5th para.		Under the section "Recent Project History" there is a mention of the 2002 fish kill. The last sentence in this paragraph should be revised to say that "Although PacifiCorp's Klamath Hydroelectric Project was not a contributing factor to the fish kill, this event brought additional attention to the Klamath Basin and the conflicts over competing uses of the basin's limited water supply." Scientific review of the fish kill (CDFG 2004) did not implicate the Klamath Hydroelectric Project in this event.

Comment 251 - Hydropower

References

NOTE: Except as listed below, the references cited in the comment tables above correspond to reference citations in the Draft EIS/EIR.

Asarian, E. J. Kann, and W. Walker. 2010. River Nutrient Loading and Retention Dynamics in Free-Flowing Reaches, 2005-2008. Final Technical Report to the Yurok Tribe Environmental Program, Klamath, CA. 59pp + appendices.

Bartholomew, J. 2008. Ceratomyxa shasta 2007 Study Summary. Prepared for Klamath River Fish Health Symposium. Funded by BOR and OR sea Grant. Department of Microbiology, OSU, Corvallis, OR. 13 p.

Bartholomew, J. 2009. Long-Term Fish Disease Monitoring Program in the Lower Klamath River. Prepared for Klamath fish Health Symposium. Funded by the BOR and OR Sea Grant. Department of Microbiology, OSU, Corvallis, OR. 13 p.

Bartholomew, J. L. and J. S. Foott. 2010. Compilation of Information Relating to Myxozoan Disease Effects to Inform the Klamath Basin Restoration Agreement. http://klamathrestoration.gov/sites/klamathrestoration.gov/files/Disease%20synthesis_11-1_final.bartholomew.foott.pdf

Deas, M.L. 2005. Klamath River Benthic Algae Monitoring Iron Gate Dam to Turwar: 2004. Presented to the Klamath River Water Quality Coordination Group – jointly sponsored by the North Coast Regional Water Quality Control Board and U.S. EPA Region IX, as well as other basin stakeholders. February 2005.

Federal Energy Regulatory Commission (FERC). 2007. Final Environmental Impact Statement for Hydropower License, Klamath Hydroelectric Project, FERC Project no. 2982-027. Federal Energy Regulatory Commission, Office of Energy Projects, Division of Hydropower Licensing. Washington, D.C. November 2007.

Foott, J. S., J. L. Bartholomew, R. W. Perry, and C. E. Walker. 2011. Conceptual Model for Disease Effects in the Klamath River. Technical Report. USFWS California-Nevada Fish Health Center, Oregon State University Department of Microbiology, and USGS Columbia River Research Laboratory. 12 pp.

PacifiCorp. 2004a. Final License Application. Volume 2. Exhibit E – Environmental Report. Klamath Hydroelectric Project (FERC Project No. 2082). PacifiCorp, Portland, Oregon. February 2004.

PacifiCorp. 2004b. Final Technical Report, Water Resources. Klamath Hydroelectric Project (FERC Project No. 2082). PacifiCorp, Portland, Oregon. February 2004.

PacifiCorp. 2004c. Final Technical Report, Fish Resources. Klamath Hydroelectric Project (FERC Project No. 2082). PacifiCorp, Portland, Oregon. February 2004.

PacifiCorp. 2006. Causes and Effects of Nutrient Conditions in the Upper Klamath River. Klamath Hydroelectric Project (FERC Project No. 2082). PacifiCorp, Portland, Oregon. November 2006. 77 pp.

PacifiCorp. 2008. Application for Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act for the Relicensing of the Klamath Hydroelectric Project (FERC No. 2082) in Siskiyou County, California Klamath Hydroelectric Project (FERC Project No. 2082). Prepared for: State Water Resources Control Board Division of Water Quality Water Quality Certification Unit 1001 I Street, 15th Floor Sacramento, California 95814. Prepared by: PacifiCorp, Portland, Oregon. March 2008.

PacifiCorp. 2009. Comments on the Public Review Draft of the Staff Report for the Klamath River Total Maximum Daily Loads (TMDLs) and Action Plan Addressing Temperature, Dissolved Oxygen, Nutrient, and Microcystin Impairments in California. PacifiCorp Energy, Portland, Oregon. August 2009.

PacifiCorp. 2010. Comments on the Public Review Draft of the Staff Report for the Klamath River Total Maximum Daily Loads (TMDLs) and Action Plan Addressing Temperature, Dissolved Oxygen, Nutrient, and Microcystin Impairments in California, the Proposed Site Specific Dissolved Oxygen Objectives for the Klamath River in California, and the Klamath River and Lost River Implementation Plans. PacifiCorp Energy, Portland, Oregon. February 2010.

PacifiCorp. 2011a. PacifiCorp Klamath Hydroelectric Project Interim Operations Habitat Conservation Plan for Coho Salmon. Prepared by PacifiCorp Energy, Portland, Oregon. October 2011.

PacifiCorp. 2011b. Results of 2010 Turbine Venting Tests to Improve Dissolved Oxygen below Iron Gate Dam. Technical Memorandum. Prepared by PacifiCorp Energy, Portland, OR. September 2011. Available at http://www.pacificorp.com/es/hydro/hl/kr.html#.

Stocking, R.W. 2006. Distribution of *Ceratomyxa shasta* (Myxozoa) and Habitat Preference of the Polychaete Host, *Manayunkia speciosa* in the Klamath River. Master of Science Thesis, Oregon State University. February 2006.

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Comment Code	Comment Response	Change in EIS/EIR
AO_LT_1230_071-1	Master Response GEN-2 Some People Approve of Dam Removal, Others Oppose Dam Removal.	No
AO_LT_1230_071-2	The PacifiCorp 2011b document referenced in this comment is dated September 2011 and was therefore not available before the Draft EIS/EIR was released to the public on September 22, 2011. However, text has been added to Section 3.2 Water Quality, Section 3.2.4.3.1.4 to describe the more recent data on the effects of Interim Measure 3. Additional language describing Interim Measure 2, Coho Enhancement Fund has been added to the Aquatic Resources section under the No Action/No Project Alternative.	Yes
AO_LT_1230_071-3	The Lead Agencies are aware of these issues and have made corrections in the Final EIS/EIR to address the inconsistencies.	Yes
AO_LT_1230_071-4	The Proposed Action has multiple elements, including removal of the Four Facilities, restoration of the reservoir areas, recreation improvements, and the connected actions of the Keno Transfer and the KBRA. The term “dam removal” may be used in some locations in the EIS/EIR, but the Lead Agencies clearly described the term in Chapter 2.	No
AO_LT_1230_071-5	Master Response AQU-17 Expert Panel Second Line of Analysis, Not the only line of Evidence.	No
AO_LT_1230_071-6	For habitats downstream from Iron Gate Dam the EDRRA model uses a retrospective analysis of survival rates observed for Chinook salmon hatchery releases from both Iron Gate and Trinity River hatcheries for the years from 1979 through 2000. Although, the water quality and fish disease are not described as individual parameters within the EDRRA model, to the extent these parameters influenced survival of hatchery releases historically (1979 to 2000) is explicitly incorporated into the EDRRA model results and is likely one of many environmental parameters reflected in the high degree of uncertainty within the model results. While it is true that existing habitat restoration actions are not are not accounted for in the EDRRA model, as shown in Figures 10 and 12 in Hendrix (2011) the existing uncertainty due to stock-recruitment dynamics is greater than the shift in productivity due to habitat restoration actions associated with implementation of the KBRA as it is currently incorporated into the model. Given the substantial difference in the magnitude of restoration actions envisioned under KBRA relative to current restoration actions, it is unlikely that the model results would show any meaningful	No

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	increases resulting from incorporation of increases in production resulting from existing habitat restoration efforts. The greatest gains in productivity are most likely associated with increased access to additional habitat upstream of Iron Gate Dam provided to Chinook salmon under the Proposed Action. The EDRRA model is only one source of evidence that is described within the Draft EIS/EIR. In addition to quantitative modeling results in this regard FERC (2007), Hetrick et al .(2009), and Hamilton et al. (2011) concluded in synthesizing available information that increased habitat access following dam removal would result in an increase in the abundance of Chinook salmon population in the Klamath River Watershed. Moreover, the Proposed Action is intended to benefit all anadromous fish and salmonids and is not limited to just Chinook salmon. Master Response AQU-21 NRC Dam Removal Help Coho. In order to further understand the likely effects of dam removal, extensive surveys and reviews have been conducted as recommended by the National Research Council (NRC) (2004) on salmon and steelhead in the Klamath Basin. Two expert panels, The Chinook Salmon Expert Panel and the Coho Salmon and Steelhead Expert Panel, were convened specifically to address these issues. Two additional expert panels were convened to address lamprey and resident fish. Master Response AQU-6 Expert Panel Coho, Steelhead and Chinook. Master Response AQU-14 Expert Panel Resident Fish. Master Response AQU-15 Expert Panel for Lamprey.	
AO_LT_1230_071-7	The specific instances of “inaccurate statements or claims” that the comment author is referring to in this comment are not specified here and absent any additional information to substantiate this comment, no response is required. The Lead Agencies have however provided responses to all comments provided by the comment author in this comment letter that refer to specific analysis and determinations presented in the EIS/EIR or in other studies that were completed by the Lead Agencies in support of the EIS/EIR.	No

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AO_LT_1230_071-8	This Final EIS/EIR reflects a number of the new reference materials that were provided as a part of this comment letter and other comments received on the Draft EIS/EIR. These updates have been made throughout the document and are indicated in Volumes I and II of this Final EIS/EIR.	Yes
AO_LT_1230_071-9	Change has been made in text of Executive Summary. Proposed Salt Caves Project added to the timeline figure.	Yes
AO_LT_1230_071-10	This description in the Executive Summary has been revised in response to multiple comments.	Yes
AO_LT_1230_071-11	Table ES-4 has been updated with revised discussions in Section 3, including significant and unavoidable impacts related to trap and haul measures. While Alternatives 2 and 4 both include seasonal trap and haul operations, they vary because they would operate under a different time period. Alternative 2 would include seasonal trap and haul operations following dam removal until water quality conditions no longer require operations. Alternative 4 would include seasonal trap and haul operations for the foreseeable future during periods of impaired water quality. Trap and haul operations are analyzed at a programmatic level throughout the document.	Yes
AO_LT_1230_071-12	The footnote has been revised, consistent with changes made in Section 3.4, to the following: We disagree with the comment. Large blooms of *Microcystis aeruginosa* would not be likely to occur in the Klamath River downstream from Iron Gate Dam under the Proposed Action because there would be no inoculum from the upstream reservoirs (i.e., Copco 1 and Iron Gate Reservoirs). It has not been demonstrated that the reservoirs are not the initial cause or source of the high algal counts or toxin concentrations that occur at downstream river sites, or that these situations can occur solely on the basis of *Microcystis aeruginosa* transport from the Upper Klamath Basin. In fact, data collection to date indicates that *Microcystis aeruginosa* from upstream sources rarely survives to enter Copco I Reservoir. Additionally, the bolded significance statement in the Draft EIS/EIR states “reduce or eliminate”, rather than just “eliminate”. Thus, the possibility for relatively smaller occurrences of nuisance and/or noxious phytoplankton in the river under the Proposed Action is already included.	Yes

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	Along these lines, and consistent with text clarifications in Section 3.4, the footnote has been revised to be the following: 'Increased periphyton (attached algae) biomass would not lead to increased algal toxin concentrations in the Klamath River. The primary habitat for supporting seasonal nuisance and/or noxious phytoplankton (suspended algae) blooms in the Hydroelectric Reach would be eliminated and there is little reason to suspect that large blooms of *Microcystis aeruginosa* from Upper Klamath Lake would be successfully transported into the Klamath River downstream from Iron Gate Dam (see Section 3.4). Therefore, the overall occurrence of nuisance and/or noxious phytoplankton and associated toxins in the Klamath River downstream from Iron Gate Dam would be substantially reduced or eliminated."	
AO_LT_1230_071-13	Change has been made in the Executive Summary, Chapter 5, and Other Required Disclosures tables.	Yes
AO_LT_1230_071-14	This description in the Executive Summary has been revised for consistency with the analysis presented in Chapter 3.	Yes
AO_LT_1230_071-15	The text in the bullet in Chapter 1 identified by the comment author has been revised to read, "severe water quality problems in the two larger reservoirs, Copco 1 and Iron Gate, including blue-green algal toxins (that can affect humans and fish), low dissolved oxygen, high temperatures, and high pH, create stressful biological conditions.	Yes
AO_LT_1230_071-16	Master Response GEN-1 Included as Part of the Record.	No
AO_LT_1230_071-17	Change has been made.	Yes
AO_LT_1230_071-18	The Bureau of Land Management (BLM) is part of the U.S. Department of the Interior (DOI). DOI is the lead agency in this NEPA process therefore, though BLM staff have participated in the NEPA process, that agency was not included as a separate cooperating agency in Table 1-2. A footnote to clarify this distinction will be added to Table 1-2 and will identify all the DOI agencies that assisted with EIS/EIR development. Those agencies are BLM, U.S. Bureau of Indian Affairs (BIA), Reclamation, USGS, and USFWS.	Yes
AO_LT_1230_071-19	The Proposed Action has multiple elements, including removal of the Four Facilities, restoration of the reservoir areas, recreation improvements, and the connected actions of the Keno Transfer and the KBRA. The term "dam removal" may be used in some locations in the EIS/EIR, but the Lead Agencies clearly described the term in Chapter 2.	No

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AO_LT_1230_071-20	The comment does not provide a specific example of where in the Draft EIS/EIR "similar temperature changes are referred to as minor in some alternatives but are characterized as significant or a problem in other alternatives." The comment may be referring to the analysis of spring water temperatures, since subsequent review of the Draft EIS/EIR indicated that the effects determinations for Water Quality (Section 3.2) were inconsistent with the effects determinations for Aquatic Resources (Section 3.3) with respect to the anticipated changes in spring water temperatures under the Proposed Action and the alternatives. The instances in which the Draft EIS/EIR found the potential for a significant effect with respect to spring water temperatures include Alternatives 2, 3 and 5 for locations immediately downstream from Copco 1 Dam and immediately downstream from Iron Gate Dam (Draft EIS/EIR Section 3.2.4.3.2.1, p. 3.2-76 to 3.2-83 and Table 3.2-14 p. 3.2-149 to 3.2-161). However, the significance determination for spring water temperatures at these locations has been changed to "less than significant" in the Final EIS/EIR based on revisions to Section 3.3 Aquatic Resources, which include an expanded analysis of the potential impacts of increased spring water temperatures on fish species.	Yes
AO_LT_1230_071-21	Additional language outlining NOAA Fisheries Service's Coho Recovery Plan, Basin-wide restoration projects, and other basin conservation plans has been added. Chapter 2 identifies the Interim Measures (IMs) that are part of the No Action/No Project Alternative because they have already been implemented or would be implemented regardless of the Determination. However, many of these IMs would not result in environmental effects. The Aquatic Resources Section only analyzes the IMs that would affect that resource.	Yes
AO_LT_1230_071-22	A sentence has been added to Section 2.4.2 to indicate how storage is used, including to restore historic wetlands, benefit water quality, and provide habitat for threatened and endangered fish. There is a discussion in the aquatics section, including: "The ongoing Wood River Wetland Restoration, Agency Lake and Barnes Ranches Project, and the Williamson River Delta Project would likely improve springtime rearing habitat for fish in the upper basin."	Yes
AO_LT_1230_071-23	Section 3.3.4.3, p. 3.3-53 of the Draft EIS/EIR describes the No Action / No Project Alternative, which includes the actions described on p. 2-14. The actions described on p. 2-14 are included in the descriptions of environmental consequences under the No Action / No Project Alternative in Section 3.3.4.3.	No

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	The reference on p. 2-14 to 2008 as the year the Williamson Delta levees were breached is a typographical error. P. 2-14 of the Draft EIS/EIR has been revised. Table 3.6-7, p. 3.6-22 and Section 3.8.3.1, p. 3.8-5 correctly identify 2007 as the year the Williamson Delta levees were breached.	
AO_LT_1230_071-24	Chapter 2 identifies the IMs that are part of the No Action/No Project Alternative because they have already been implemented or would be implemented regardless of the Determination. This section describes all of the IMs that meet these criteria; however, many of these IMs would not result in environmental effects. Each resource area only analyzes the IMs that would affect that resource. Based on the best available information, IM 8 appears to be scheduled for implementation in the near future; therefore, the Lead Agencies have left the measure as part of the No Action/No Project Alternative.	No
AO_LT_1230_071-25	The hydraulic and hydrologic modeling did not include implementation of IM 5 because it is uncertain as to how this would be implemented. Because IM 5 is not in the simulations, future flows may vary from the modeled flows, but it is uncertain as to how much difference there would be. The Lead Agencies felt it speculative as to how to include it because of the constraints on water supply, power, and operations of PacifiCorp. Ramp rates and minimum flow releases of 100 cfs at J.C. Boyle are incorporated into the modeling.	No
AO_LT_1230_071-26	Master Response WQ-43 Handling of Uncertainty in the Water Quality Analysis, Including TMDLs. Clarifying text has been added to Section 3.2.4.1. regarding the use of existing water quality models for the analysis of the No Action/No Project Alternative, including a brief discussion of the review process for the California Klamath River TMDLs and the understanding that they are sufficiently reliable for the purpose in which they are used in the Klamath River Facilities EIS/EIR.	Yes
AO_LT_1230_071-27	The Proposed Action has multiple elements, including removal of the Four Facilities, restoration of the reservoir areas, recreation improvements, and the connected actions of the Keno Transfer and the KBRA. The term “dam removal” may be used in some locations in the EIS/EIR, but the Lead Agencies clearly described the term in Chapter 2.	No

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AO_LT_1230_071-28	Note 1 on Table 2-10 revised for clarity.	Yes
AO_LT_1230_071-29	The comment author is correct that the first sentence in the second paragraph of Section 2.4.3.7 is unclear. The sentence has been revised to: "Prior to the transfer, any necessary improvements to the facility in order to meet DOI Directives and Standards for dam safety *would be completed*."	Yes
AO_LT_1230_071-30	Flows recommendations and ramp rates which effect habitat of ESA-listed species, including coho salmon below Iron Gate Dam, are prescribed by the 2010 NOAA Fisheries Service biological opinion on the operations of Reclamation's Klamath Project. These flows and ramp rates were assumed to remain in place for the purposes of the hydrologic modeling. Water made available from Reclamation's Klamath Project to meet the prescribed flows is currently passed through Keno Dam, and no modifications in the operations of Keno Dam are needed to meet the flow recommendations. Ramp rates are specific to releases from Iron Gate Dam. The ramp rates are based on the relationship between flow and habitat in the Klamath River below Iron Gate Dam. Should the Four Facilities be removed, the baseline conditions (type and amount of habitat available) would change as the river becomes free flowing through the hydroelectric reach. Removal of the Four Facilities would allow Chinook salmon to migrate upstream to Keno Dam and beyond. Coho salmon are expected to migrate at least to Spencer Creek. At that time the effect on ESA listed species from the operations of Reclamation's Klamath Project, which would then including the operations of the transferred Keno Dam, would need to be re-evaluated in light of the change in baseline habitat conditions. If it is determined the operation of Reclamation's Klamath Project may affect ESA listed species or adversely modify listed critical habitat Reclamation would enter into consultation with the NOAA Fisheries Service and/or the USFWS, as appropriate. The baseline conditions and use of habitat by listed species would not be known until after Facilities Removal. This EIS/EIR cannot speculate on the results of a potential future ESA consultation which may take place after the year 2020, and any changes to Keno Dam operations that may be needed to conserve listed species.	Yes
AO_LT_1230_071-31	The text of the Draft EIS/EIR has been revised to address this comment.	Yes
AO_LT_1230_071-32	The sentence "The project may also reduce fish stress during the spring by delaying the increase in water temperature to stressful levels during the start of the smolt outmigration period (FERC 2007; page 3-309)." has been removed from the EIS/EIR	No

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	because additional analysis recently conducted by the Lead Agencies indicates that FERC's conclusion in this case is not well supported.	
AO_LT_1230_071-33	The more general footnote to Table 3.2-2 in the Draft EIS/EIR states the following: "Designated basin-specific beneficial uses for the Klamath Basin (OAR 340-041-0180) include specific fish uses to be protected (i.e., bull trout spawning and juvenile rearing, core cold-water habitat, redband or Lahontan cutthroat trout, and cool water species [no salmonid use]) and are depicted in Oregon DEQ 2004." The statement in the Draft EIS/EIR is correct; however, to clarify, the more detailed statement in the comment has been used to replace the footnote in the Draft EIS/EIR.	Yes
AO_LT_1230_071-34	"ORS" is correctly defined as "Oregon Revised Statutes" in the Final EIS/EIR. The following sentence has been added to the paragraph referenced in the comment: "ORS 468B.050 and 468B.053 provide for ODEQ to issue permitted exemptions from ORS 468B.025(1)."	Yes
AO_LT_1230_071-35	The sentence "Water temperatures must support all life stages of temperature-sensitive aquatic communities" has been replaced with "…protect designated temperature-sensitive, beneficial uses, including specific salmonid life cycle stages in waters of the State" based on OAR 340-041-0028(3) from Oregon Administrative Rules (OARs) filed through January 13, 2012 (http://arcweb.sos.state.or.us/pages/rules/oars_300/oar_340/340_041.html). "OAR 340-041-0028(b)" is not listed in OAR 340-041-0028; however, OAR 340-041-0185, the Klamath Basin specific criterion for water temperature is provided in Draft EIS/EIR Table 3.2-3, which states the following: "From June 1 to September 30, no NPDES point source that discharges to the portion of the Klamath River designated for cool water species may cause the temperature of the water body to increase more than 0.3°C (0.5°F) above the natural background after mixing with 25% of the stream flow. Natural background for the Klamath River means the temperature of the Klamath River at the outflow from Upper Klamath Lake plus any natural warming or cooling that occurs downstream. This criterion supersedes OAR 340-041-0028(9)(a) during the specified time period for NPDES permitted point sources."	Yes
AO_LT_1230_071-36	As noted on p. 3.2-63, 65, 68 and 103 the Hoopa Valley Tribe Water Quality Control Plan applies to the Hoopa Reach of the Klamath River (≈RM 45–46).	No

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AO_LT_1230_071-37	Clarifying text has been added to Section 3.2.4.1. regarding the use of existing water quality models for the analysis of the No Action/No Project Alternative, including a brief discussion of the review process for the California Klamath River TMDLs and the understanding that they are sufficiently reliable for the purpose in which they are used in the Klamath River Facilities EIS/EIR. In addition, as stated in Section 3.2.4.1.1 (p. 3.2-36, with respect to water temperature), “since no one existing model captures all of the elements analyzed for water temperature in this Klamath Facilities Removal EIS/EIR, where possible, model outputs are used in combination to assess similar spatial and temporal trends in predicted water temperature.” The same is true for the dissolved oxygen analysis (Section 3.2.4.1.4, p. 3.2-38 to 3.2-39) and for nutrients (Section 3.2.4.1.3, p. 3.2-37 to 3.2-38), where the latter primarily uses the results of an empirical analysis conducted by Asarian et al. (2010) rather than the TMDL model nutrient results (the TMDL model results are only used to assess general trends). Further, as presented in Section 3.2.4.3 Effects Determinations (p. 3.2-47 to 3.2-147), the Klamath River TMDL model results generally agree with the results of other numeric modeling efforts conducted in the Klamath Basin and cited in the Draft EIS/EIR.	Yes
AO_LT_1230_071-38	The annual TP and TN allocations are presented in Draft EIS/EIR Section 3.2.2.4.4, p. 3.2-17 as shown in the Klamath River TMDL, Table 5.1 (North Coast Regional Water Quality Control Board [NCRWQCB] 2010). No change is necessary.	No
AO_LT_1230_071-39	Additional detail regarding water temperature in the Klamath River downstream from Iron Gate Dam is provided in Appendix C, Section C.1.2.1. Figures C-1 and C-2 show Karuk Tribe data for daily average water temperatures at or near 26 C during summer months (i.e., very warm). The text is also clear that the middle portion of the Klamath River, including the reach between Iron Gate Dam and the Salmon River, is listed as impaired under Section 303(d) of the CWA for water temperatures. No change to the text is required.	No
AO_LT_1230_071-40	The comment cites the discussion of existing conditions in Draft EIS/EIR Section 3.2.3. The J.C. Boyle Springs are discussed in existing conditions for nutrients in Section 3.2.3.4 Nutrients as well as in Appendix C, Section C.3.1.4 Hydroelectric Reach. The literature cited (i.e., PacifiCorp 2004a; FERC 2007, Butcher 2008, Asarian et al., 2009) provides a range of nutrient concentrations similar to those in the comment, and indicates that the springs cause a general dilution of nutrient concentrations from upstream; however, the cited literature does not state that these	No

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	inputs are from natural sources. This has been changed in the Draft EIS/EIR (Section 3.2.3.4) to the following: "On an annual basis, nutrients typically decrease through the Hydroelectric Reach due to the dilution by the springs downstream from J.C. Boyle Reservoir. Nutrient concentrations in the springs, which represent natural sources, are approximately 0.22 mg/L TN (almost exclusively dissolved) and approximately 0.06 – 0.08 mg/L TP, which is also mostly dissolved (Asarian et al. 2010). Settling of particulate matter and associated nutrients in Copco 1 and Iron Gate Reservoirs also contributes to the overall decreasing trend for nutrients in the Hydroelectric Reach on an annual basis." Details on the reported concentrations from the springs have been added to Draft EIS/EIR Appendix C (Section C.3.1.4) as shown below. These changes do not affect the significance determinations. Changes to Appendix C (C.3.1.4) are as follows: According to Asarian et al. (2010), "IFR and PCFFA (2009) estimated long-term average nutrient concentrations of these springs using mixing equations and PacifiCorp's 2001-2007 nutrient sampling data from the top and bottom of the J.C. Boyle Peaking Reach (bracketing above and below the springs). For the 37 pairs of samples evaluated, median spring flow was 262 cfs and median concentrations (in units of mg/L) were TN=0.227, TIN=0.211, NO3+NO2=0.220, NH3=0.002, TP=0.065, PO4=0.043, and P=0.016. Using a similar (but less detailed) approach, Gard (2006) used 2001-2003 PacifiCorp data and mixing equations (assuming constant spring flows of 225 cfs) to calculate springs concentrations of 0.23 mg/L NO3 and 0.08 PO4, very similar to the IFR and PCFFA (2009) value for nitrogen but lower for phosphorus. Using values derived through model calibration for the year 2000, the Klamath TMDL model uses a TP concentration of 0.0688 mg/L and a TN concentration of 0.314 mg/L (TetraTech 2009)." The settling of particulate matter and associated nutrients in the larger Klammath Hydroelectric Project (KHP) reservoirs (PacifiCorp 2004a; FERC 2007, Butcher 2008, Asarian et al. 2009) also contributes to decreases in nutrient concentrations in the Klamath River from the Oregon-California stateline to Iron Gate Dam, while on a seasonal basis the TN and TP can increase in this reach due to release of nutrients to the water column during periods of seasonal hypolimnetic anoxia (Kann and Asarian 2006; Asarian and Kann 2006a, 2006b; Butcher 2008; Asarian et al. 2009, et al. 2010).	

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	It is also noted here that these concentrations represent a dilution of nutrient concentrations from upstream under current conditions. Therefore, they would only become an important future source relative to algal production during severe drought conditions, such that stream flows coming from upstream are much lower than normal, or if future restoration or management actions (e.g., KBRA and TMDLs) are able to successfully reduce incoming nutrient concentrations to the point where they are lower than those in the springs.	
AO_LT_1230_071-41	The premise of the comment seems to be that the Draft EIS/EIR does not adequately consider how large amounts of organic matter seasonally discharged from Upper Klamath Lake affect water quality (specifically dissolved oxygen) in downstream reaches of the upper Klamath River. There are discussions of algal-derived (organic) suspended materials and seasonal algal blooms being released to the Upper Klamath River on a seasonal basis from Upper Klamath Lake included in numerous places in the water quality analyses conducted in Draft EIS/EIR Section 3.2 (see Sections 3.2.3.3 [p. 3.2-33], 3.2.3.7 [p. 3.2-29], and Appendix C Section C.2.1.3 [p. C-12 to C-13]), where the high loads of organic matter coming into the upper Klamath River are linked to low seasonal dissolved oxygen concentrations in the Keno Impoundment and downstream reaches of the upper Klamath River (Sections 3.2.2.5 [p. 3.2-25 to 3.2-26], 3.2.4.3.1.4 [p. 3.2-61 to 3.2-63], and Appendix C Section C.4.1.3 [p. C-35 to C-39]). For example, in the dissolved oxygen analysis under the No Action/No Project Alternative the analysis states the following: “Thus, full attainment of the Oregon and California TMDLs would eventually be beneficial for dissolved oxygen in the Hydroelectric Reach. Full attainment could require decades to achieve and it is highly dependent on improvements in dissolved oxygen in Upper Klamath Lake and the upstream reach from Link River Dam to J.C. Boyle Dam (particularly Keno Impoundment and Lake Ewauna).” There is no reference to very large fluxes occurring 2 out of every 8 years in the Upper Klamath Lake TMDL (ODEQ 2002) or the Walker model upon which the TMDL is based (Walker 2001).	No
AO_LT_1230_071-42	Nutrient spiraling is indeed a well-accepted topic in river nutrient dynamics, enough so that its inclusion in the Draft EIS/EIR is implicit rather than explicit. Discussions of nutrient retention in the free-flowing, periphytic reaches of the Klamath River, including the sources cited in the Draft EIS/EIR, necessarily rely on spiraling concepts, including recycling, in their analysis. Descriptions of current conditions inherently include nutrient spiraling effects in descriptions of riverine nutrient concentrations. In addition, the RMA-11 model that the Klamath River Water	Yes

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	Quality Model (FERC 2007) and the Klamath River TMDL model (NCRWQCB 2010) are based on includes periphyton nutrient uptake and release (i.e., recycling) as part of the model algorithm (Tetra Tech 2009). However, the comment's suggestion that recycling would create additional nutrients beyond those discussed, that could support downstream primary production in the Klamath River, is not necessarily accurate. This is because the estimates of retention and downstream nutrient concentrations taken from Asarian et al. (2010) or other references generally consider the late summer or fall seasons when nutrient exports and concentrations in the river are already at their maximum (i.e., the benthic spiraling and recycling processes are already accounted for). It is potentially more accurate to state that estimates of retention are conservative because they do not incorporate early spring or summer periods when biomass growth is more active. The lack of specific mention of spiraling or recycling does not, therefore, change the understanding of either the No Action/No Project Alternative or the Proposed Action, nor does it change any significance determinations. Finally, while it is broadly accepted that spiraling and recycling processes are occurring in the Klamath River, it would be overstating the state of the science to attempt quantitative estimates of spiraling or recycling in such a large and uncertain system. It is probably most accurate to state that retention and recycling processes would occur, with generalized descriptions of the potential effects, than to make specific predictions. Nonetheless, the text of the Draft EIS/EIR has been modified to reflect the understanding that nutrient spiraling does occur in the Klamath River, and that spiraling would be part of the overall nutrient dynamics in the river under any of the Project alternatives. Section 3.2.3.4 has been revised as follows: "Further decreases in TN occur in the mainstem river due to a combination of tributary dilution and in-river nutrient spiraling processes by periphyton (Mulholland 1996). These processes strongly affect nitrogen concentrations in flowing rivers through removal processes such as denitrification and/or assimilation and storage related to biomass uptake (Asarian et al. 2010), or by late-seasonal recycling of nutrients downstream as active periphyton growth wanes." Additionally, the following sentence has been added to Final EIS/EIR Section 3.2.4.3.2.3 – Lower Klamath Basin: "This calculation implicitly includes nutrient recycling processes such	

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	as assimilative uptake for algal growth and subsequent downstream release, as these processes were ongoing and inherently included in the retention estimates determined for existing conditions.	
AO_LT_1230_071-43	Additional detail related to seasonal nutrient dynamics in the Project reservoirs is presented in Appendix C, Section C.3.1.4. As stated in Section C.3.1.4, “Downstream from J.C. Boyle Dam, TN and TP concentrations generally decrease with distance, with both mean longitudinal concentrations (Raymond 2008, 2009, 2010; Watercourse Engineering, Inc. 2011) and flow-weighted longitudinal concentrations trending strongly downward through Copco 1 and Iron Gate Reservoirs, particularly for TN (see Figure C-14 and C-15 for flow-weighted concentration data; Asarian et al. 2009, et al. 2010). A frequent and notable exception occurs during August–November, when TP concentrations are often higher at Iron Gate Dam than they are at Keno Dam and upstream of Copco 1 Reservoir; this is likely due to the combination of internally-driven nutrient dynamics related to algal bloom crashes in Copco 1 and Iron Gate Reservoirs and a 1- to 2-month temporal lag due to the longer hydraulic retention time of the reservoirs as compared to free-flowing river reaches (Kann and Asarian 2007, Asarian et al. 2009, et al. 2010, Watercourse Engineering, Inc. 2011).” No change is needed in the Draft EIS/EIR text based on this portion of the comment. While to date there have been no explicit measurements of denitrification in the middle and lower Klamath River, the sentence referenced in the comment includes denitrification as a ubiquitous in-river nitrogen removal process that has been discussed in tribal analyses of nutrient dynamics in the Project reservoirs and the free-flowing Klamath River. Based on another PacifiCorp comment, this section has been revised as follows: “Further decreases in TN occur in the mainstem river due to a combination of tributary dilution and in-river nutrient spiraling processes by periphyton (Mulholland 1996). These processes strongly affect nitrogen concentrations in flowing rivers through removal processes such as denitrification and/or assimilation and storage related to biomass uptake (Asarian et al. 2010), or by late-seasonal recycling of nutrients downstream as active periphyton growth wanes.” This comment does not indicate whether “remarkably smaller” refers to the rate of denitrification or the relative contribution of denitrification to overall nitrogen removal processes (or some other denitrification metric) in lakes/reservoirs versus rivers. In anoxic bottom sediments of stratified lakes and reservoirs, denitrification rates can be seasonally quite high and would likely	Yes

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	be much greater than in relatively more toxic river sediments. However, relatively low rates of denitrification over hundreds of miles of river length can contribute substantially to nitrogen removal from a river system and should not be dismissed without careful consideration, particularly if, as the comment indicates, there have not yet been explicit measurements made in the Klamath River. The sentence on nutrient limitation of periphyton in lower reaches of the Klamath River has been deleted because it was speculative and not entirely consistent with other statements in the Draft EIS/EIR regarding the predominance of nitrogen-fixing periphyton in these reaches (consistent with the comment).	
AO_LT_1230_071-44	The Draft EIS/EIR p. 3.2-25 does not state that the Project reservoirs are net producers of orthophosphate, ammonium, or nitrate. It states the following: "On a seasonal basis, TP, and to a lesser degree, TN can increase in this reach due to the release (export) of dissolved forms of phosphorus (ortho-phosphorus) and nitrogen (ammonium) from reservoir sediments during periods of summer and fall hypolimnetic anoxia (see Appendix C for additional details)." No change is required.	No
AO_LT_1230_071-45	The low buffering capacity of the Klamath River is presented in Draft EIS/EIR Section 3.2.4.3.2.5 (p. 3.2-115) and Appendix C, C.5.2.1 (p. C-47). To further clarify, the following sentence from Appendix C has been added to Section 3.2.3.6. "Because the Klamath River is a weakly buffered system (i.e., has typically low alkalinity <100 mg/L; PacifiCorp [2004a], Karuk Tribe of California [2010]) it is susceptible to photosynthesis-driven daily and seasonal swings in pH." The Draft EIS/EIR does not describe pH as elevated "just immediately below Iron Gate Dam". For example, in the second to last paragraph in Section 3.2.4.3.2.5, pH is described as being highest just upstream of Shasta River and can also be elevated elsewhere in the lower Klamath River: "The most extreme pH exceedances typically occur just upstream of Shasta River; values generally decrease with distance downstream (FERC 2007; Karuk Tribe of California 2007, 2009, 2010). During the summer months, pH values also are elevated in the lower Klamath River from Weitchpec downstream to approximately Turwar Creek (see Appendix C for more detail)." It is not within the scope of the EIS/EIR to evaluate the California Basin Plan water quality objective of 8.5 pH units, nor is it necessary to support the effects determinations for the Proposed Action and the alternatives.	Yes
AO_LT_1230_071-46	The EIS/EIR has been revised to include the requested information.	Yes

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AO_LT_1230_071-47	Clarifying text has been added to Section 3.2.4.1. regarding the use of existing water quality models for the analysis of the No Action/No Project Alternative, including a brief discussion of the review process for the California Klamath River TMDLs and the understanding that they are sufficiently reliable for the purpose in which they are used in the Klamath River Facilities EIS/EIR. In addition, as stated in Section 3.2.4.1.1 (p. 3.2-36, with respect to water temperature), “since no one existing model captures all of the elements analyzed for water temperature in this Klamath Facilities Removal EIS/EIR, where possible, model outputs are used in combination to assess similar spatial and temporal trends in predicted water temperature.” The same is true for the dissolved oxygen analysis (Section 3.2.4.1.4, p. 3.2-38 to 3.2-39) and for nutrients (Section 3.2.4.1.3, p. 3.2-37 to 3.2-38), where the latter primarily uses the results of an empirical analysis conducted by Asarian et al. (2010) rather than the TMDL model nutrient results (the TMDL model results are only used to assess general trends). Further, as presented in Section 3.2.4.3 Effects Determinations (p. 3.2-47 to 3.2-147), the Klamath River TMDL model results generally agree with the results of other numeric modeling efforts conducted in the Klamath Basin and cited in the Draft EIS/EIR.	Yes
AO_LT_1230_071-48	With regard to IM 3, the PacifiCorp 2011 report on the results of turbine venting at Iron Gate Dam was not available in September 2011 when the Public Draft EIS/EIR was published. While the PacifiCorp report of 2010 turbine venting data is published as “September 2011”, the PacifiCorp Web site indicates that it was not posted ("created") until the evening of 10/14/2011 and was modified on 10/24/2011 (see document properties). The 2008 results were reviewed as part of the analysis conducted for the Draft EIS/EIR; however, as stated in the text below, the 2008 results did not demonstrate that turbine venting at Iron Gate Dam is a viable long-term solution for improving dissolved oxygen, hence the language used in the Draft EIS/EIR Section 3.2.4.3.1.4. Since the 2010 results are now available, and they provide more detailed information regarding the possible benefits of turbine venting than the 2008 results, these results, along with those of 2008, have been summarized and added to Section 3.2.4.3.1.4 of the Final EIS/EIR, as follows: “Under the No Action/No Project Alternative, IM 3, Iron Gate Turbine Venting, as part of ongoing KHSA IM studies (see also Section 3.2.4.1), may be used to augment dissolved oxygen in the river downstream from the dam prior to 2020. Pilot study results from 2008 indicated that dissolved oxygen levels immediately downstream from Iron Gate Dam can be increased through the mechanical introduction of oxygen as water passes	Yes

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	through the turbines (i.e., turbine venting). PacifiCorp reported an increase of approximately 0.5 to 2 mg/L dissolved oxygen (approximately 7 to 20 percent saturation) observed across August and October 2008 tests (Carlson and Foster 2008, PacifiCorp 2008a). However, during the October 2008 test, when the upstream reservoirs were de-stratifying and dissolved oxygen concentrations in the river immediately downstream from Iron Gate Powerhouse were decreasing to levels of approximately 6.5 mg/L, turbine venting only increased concentrations at this location by approximately 0.5 mg/L and 7 percent saturation (Carlson and Foster 2008). As part of their review of PacifiCorp's requested "Authorization for Incidental Take and Implementation of KHP Interim Operations Habitat Conservation Plan for Coho Salmon", USEPA indicated that the 2008 study did not demonstrate the efficacy of the proposed turbine venting to significantly improve dissolved oxygen downstream from Iron Gate Dam (USEPA 2011). Further testing conducted in 2010 indicated that turbine venting in combination with a forced air blower was the most effective of three methods tested (i.e., turbine venting, blower, turbine venting plus blower), resulting in an initial increase in dissolved oxygen percent saturation from approximately 50 percent to just over 70 percent immediately downstream from the Iron Gate Powerhouse (PacifiCorp Energy 2011). Throughout the 6-mile test reach downstream from the powerhouse, dissolved oxygen concentrations continued to increase for all tested methods, as well as for ambient (i.e., no treatment) conditions, due to river re-aeration. For the turbine venting plus blower treatment, dissolved oxygen concentrations achieved the reach-specific Basin Plan water quality objective of 90 percent saturation (i.e., October 1 through March 31 from Stateline to Scott River) at the end of the 6-mile test reach. Ambient conditions (i.e., no treatment) achieved approximately 88 percent saturation at the end of the 6-mile reach (PacifiCorp Energy 2011). Although turbine venting treatments considerably improved dissolved oxygen concentrations in the 6-mile test reach, particularly in the first 1 to 3 miles downstream from the dam, the full compliance point in the river with turbine venting did not shift considerably further upstream as compared with that of ambient conditions (i.e., no treatment). Thus, although there have been improvements from the initial tests, turbine venting efforts have not yet been demonstrated to be a viable long-term solution for dissolved oxygen impairment from the reservoirs." The sentence "IMs 5, 7, 8, and 13 are part of the No Action/No Project Alternative because they would be implemented as part of PacifiCorp's Habitat Conservation Plan" and the associated footnote have been deleted from the Final EIS/EIR.	

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AO_LT_1230_071-49	The sentence has been changed to the following: "IM 5, Iron Gate Flow Variability, would alter flow variability, but the flows would stay within the range of historical flows."	Yes
AO_LT_1230_071-50	Recognizing that implementation of many elements of the KBRA are unknown and not reasonably foreseeable at this time, the connected action analysis is being undertaken at a programmatic level. The KBRA analysis in the Draft EIS/EIR is programmatic, as described in Section 15168 of the CEQA Guidelines. A program-level document is appropriate when a project consists of a series of smaller projects or phases that may be implemented separately. At a programmatic level of analysis, increasing flows in the Upper Klamath Basin would be likely to decrease the potential solar heating of stream flows during critical summer months (Section 3.2.4.3.2.10 - Water Diversion Limitations). Under the programmatic EIR approach, future projects or phases may require additional, project-specific environmental analysis including an evaluation of compliance with Federal laws such as the CWA and ESA. Consequently, appropriate NEPA compliance would be completed for the separate KBRA components in the future. Conversely, the Interim Measures are part of the KHSA, which is being evaluated in the EIS/EIR at the project level. More detail for project-level analyses is warranted and required by Section 15168 of the CEQA Guidelines in order to evaluate planning, construction, and operation of the project. Where possible, available data related to the Interim Measures have been considered as part of existing conditions for the water quality and fisheries analyses (see Draft EIS/EIR Section 3.2.4.1, p. 3.2-34). Future conditions include "reasonably foreseeable actions" that are independent of FERC licensing and are expected to occur during the 50-yr period of analysis (2012 to 2061). With respect to water quality in the Klamath Basin, reasonably foreseeable actions include implementation of TMDLs for Oregon and California (see full list of reasonably foreseeable actions associated with water quality in Section 3.2.4.1, p. 3.2-25). The Draft EIS/EIR states the uncertainty inherent in analyzing future conditions, including uncertainty related to TMDL implementation, in multiple places throughout Section 3.2, 3.3 and 3.4.	No
AO_LT_1230_071-51	Master Response WQ-43 Handling of Uncertainty in the Water Quality Analysis, Including TMDLs. Master Response AQU-17 Expert Panel Second Line of Analysis, Not the only line of Evidence.	No

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AO_LT_1230_071-52	As described in Draft EIS/EIR Section 3.2.4.1, p. 3.2-35, the water quality analysis considers both short-term and long-term effects of the Reclamation's Klamath Project alternatives. For water quality, the short-term effects would be heavily influenced by the release of fine sediment deposits currently stored behind the dams to the downstream river reaches, the estuary, and the marine near shore environment. This is because mobilization of reservoir sediment deposits would be most intense during the first year or two following dam removal, when the majority of sediments would be eroded by river flows (Reclamation 2012d, Stillwater Sciences 2008). Short-term effects would also occur as a result of construction activities related to fish passage structures and restoration activities associated with dam removal and KBRA implementation. Short-term effects for dissolved oxygen would also occur within 1-2 years of dam removal. Short-term effects for other resources may occur on a different timescale than water quality effects, depending on the particular interactions involved.	No
AO_LT_1230_071-53	The environmental baseline for the water quality analysis in the Draft EIS/EIR is described in Draft EIS/EIR Section 3.2.4.1, p. 3.2-33 to 3.2-55, as the 10 to 12-year period prior to Water Year (WY) 2012 plus reasonably foreseeable actions associated with water quality during the 50-year period of analysis. The Draft EIS/EIR does not equate the natural conditions scenario used in the TMDL model to the environmental baseline for the water quality analyses. A response to the second sentence in the comment is not required under CEQA or NEPA because the comment does not raise a significant environmental issue (CEQA Guidelines, Section 15088; NEPA Regulations 40 CFR Part 1503.4). Many comment authors expressed personal opinions, histories or experiences which are not appropriately addressed as part of the NEPA/CEQA process. This comment will be included as part of the record and made available to decision makers prior to a final decision on the Proposed Action.	No
AO_LT_1230_071-54	Concern #1: 3.2.4.1.1 3.2-36 Regarding temperature modeling, PacifiCorp documentation (e.g., PacifiCorp 2004b) makes it clear that the simulation models used for the FERC process were not calibrated for winter due to lack of available data. The TMDL models suffer from the same defect. Yet, winter results from the models are used throughout the document. (See PacifiCorp comments on the Oregon and California TMDLs). 3.2.4.1.1 and 3.2.4.1.3. 3.2-36 and 3.2-37. Model results for winter (December through February), while shown in graphs of anticipated annual water temperature trends, are not discussed in the Draft EIS/EIR. The comment does not	No

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	state whether PacifiCorp's concerns with the Klamath River TMDL model have any effect on the significance calls for water temperatures. This portion of the comment does not raise a significant environmental issue (CEQA Guidelines, Section 15088; NEPA Regulations 40 CFR Part 1503.4) and therefore does not require a response under CEQA or NEPA. Many comment authors expressed personal opinions, histories or experiences which are not appropriately addressed as part of the NEPA/CEQA process. This comment will be included as part of the record and made available to decision makers prior to a final decision on the Proposed Action. Concern #2: Regarding TMDL simulations used in these assessments, please see PacifiCorp comments regarding both California and Oregon TMDL documents. Several key elements that are addressed in detail in PacifiCorp's comments include, but are not limited to: (1) infeasible boundary conditions at Link Dam which render the assessment and load allocations unachievable (essentially calling for a trophic shift in Upper Klamath Lake from hypereutrophic to mesotrophic conditions for several constituent forms; (2) the fate of these nutrients downstream, wherein conditions below Keno Dam are so low that the modeling analysis show no growth for much of the summer (infeasible); (3) the temperature modeling uses an erroneous factor that reduces solar radiation by 20 percent, leading to erroneous under prediction by the temperature models. All TMDL temperature modeling results, particularly in California, are erroneous. Response: While the comment refers to p. 3.2-36 and 3.2-37, which present a discussion of how existing water temperature modeling results were used in the analysis for the Proposed Action, the comment does not state whether PacifiCorp's concerns with the Klamath River TMDL model have any effect on the significance calls for water temperatures. Regarding (1) the infeasible boundary conditions at Link Dam and (2) the fate of nutrients downstream, there is no relationship to nutrients and water temperature in the analyses therefore this comment is inappropriate with respect to p. 3.2-36 and 3.2-37. The approach to using the Klamath River TMDL model output for nutrients is described in Draft EIS/EIR Section 3.2.4.1.3 (p. 3.2-37 to 3.2-38), which states that the TMDL model results are used along with results from the PacifiCorp models developed for the FERC process, and a third empirical analysis conducted by Asarian et al. (2010). The TMDL model results are only used to assess general patterns. Further, as stated in Section 3.2.4.3.2.3 (p. 3.2-101 to 3.2-104)," Results of all of the evaluations recognize the trapping efficiency of the reservoirs with respect to TP and TN, such that under the Proposed Action total nutrient concentrations	

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	in the Klamath River downstream from Iron Gate Dam would increase." The comment does not state whether PacifiCorp's concerns with the Klamath River TMDL model have any effect on the significance calls for nutrients. Regardless, the water quality nutrient analysis presented in the Draft EIS/EIR for the Proposed Action is not dependent on achieving TMDL targets. With respect to (3) the 20% reduction in solar energy, the comment does not explain how this potential bias would change the TMDL model results such that the significance determinations for water temperature would change. In addition, as stated in Section 3.2.4.1.1 (p. 3.2-36), "since no one existing model captures all of the elements analyzed for water temperature in this Klamath Facilities Removal EIS/EIR, where possible, model outputs are used in combination to assess similar spatial and temporal trends in predicted water temperature." Other models used for the long-term analysis include the Klamath River Water Quality Model (KRWQM) developed by PacifiCorp for the FERC relicensing process and the RBM10 water temperature model developed for the Secretarial Determination studies (see Draft EIS/EIR Appendix D for details).	
AO_LT_1230_071-55	The reference to OAR has been replaced with ODEQ (2011).	Yes
AO_LT_1230_071-56	The Oregon Klamath River TMDL (Kirk et al. 2010) states the following (p. 2-58): "Both Keno Dam and J.C. Boyle Dam increase the river temperature during the summer (Figure 2-44 and Figure 2-45). The allocations in Table 2-15 apply during the period of impairment: June 1 – September 30. The point of maximum impact for the J.C. Boyle facility is at the stateline. PacifiCorp is proposing to remove the East Side and West Side developments and therefore Department of Environmental Quality (DEQ) does not give a heat load allocation to these sources, and their operations can result in no measurable temperature increase to the Klamath River." Oregon's temperature standards are presented in Draft EIS/EIR Table 3.2-3 as follows: "Water temperature must support all life stages of temperature-sensitive aquatic communities. Natural Conditions Criteria: Where the department determines that the natural thermal potential of all or a portion of a water body exceeds the biologically-based criteria, the natural thermal potential temperatures supersede the biologically-based criteria, and are deemed to be the applicable temperature criteria for that water body. From June 1 to September 30, no National Pollutant Discharge Elimination System (NPDES) point source that discharges to the	No

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	portion of the Klamath River designated for cool water species may cause the temperature of the water body to increase more than 0.3°C (0.5°F) above the natural background after mixing with 25% of the stream flow. Natural background for the Klamath River means the temperature of the Klamath River at the outflow from Upper Klamath Lake plus any natural warming or cooling that occurs downstream. This criterion supersedes OAR 340-041-0028(9)(a) during the specified time period for NPDES permitted point sources."	
AO_LT_1230_071-57	The language on p. 3.2-49 of the Draft EIS/EIR indicated that PacifiCorp has not identified a proposed action to achieve temperature allocations assigned to Copco 1 and Iron Gate Dams under the TMDL. The Draft EIS/EIR did not however make any assertions on p. 3.2-49 relative to PacifiCorp's TMDL implementation obligations. No change has been made in the Final EIS/EIR.	No
AO_LT_1230_071-58	The language describing the temperature criterion has been revised.	Yes
AO_LT_1230_071-59	The period of analysis for the Klamath Facilities Removal EIS/EIR is 50 years.	No
AO_LT_1230_071-60	Long-term quantitative analyses for the Project alternatives rely on existing models developed by PacifiCorp for the FERC relicensing process, the NCRWQCB for development of the Klamath River TMDLs, and the Secretarial Determination studies (see Appendix D for details). Multiple numeric models are used for the water quality analyses conducted in the Klamath Facilities Removal EIS/EIR because no one existing numeric model captures all of the long-term water quality conditions anticipated for Project alternatives. These models are described in Section 3.2.4.1 (p. 3.2-33 to 3.2-42) and Appendix D of the Draft EIS/EIR. The model developed by PacifiCorp includes multiple scenarios that successively remove Iron Gate, Copco 1 and 2, J.C. Boyle, and Keno Dams. These scenarios are helpful for elucidating the effects of the individual dams/reservoirs, and are particularly helpful in the analysis of Alternative 5 in Section 3.2.5.3.4.1 Water Temperature – Upper Klamath Basin. However, the PacifiCorp models do not include climate change, so multiple lines of evidence are used in the Draft EIS/EIR. No change is necessary.	No
AO_LT_1230_071-61	Uncertainty is inherent to any analysis of future conditions, particularly in a system as complex as the Klamath Basin. The degree of uncertainty should always be considered as part of the	No

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	decision-making process. The TMDLs themselves consider uncertainty when estimating the assimilative capacity of a water body and setting limits on the amount of pollution that can be added and still meet water quality standards; CWA Section 303(d) requires that TMDLs are established with a margin of safety to account for uncertainty. The Draft EIS/EIR has been prepared according to requirements of NEPA and CEQA. Accordingly, assessments of the effects of the Proposed Action and alternatives on future water quality and algae conditions in the Klamath River involve comparison to both existing conditions (CEQA) and future conditions (NEPA). Future conditions include "reasonably foreseeable actions" that are independent of FERC licensing and are expected to occur during the 50-yr period of analysis (2012 to 2061). With respect to water quality in the Klamath Basin, reasonably foreseeable actions include implementation of TMDLs for Oregon and California (see full list of reasonably foreseeable actions associated with water quality in Section 3.2.4.1, p. 3.2-25). Uncertainty is inherently associated with each of the reasonably foreseeable actions, including TMDL implementation, and does not eliminate the requirement to include these actions in the analyses. The same is true for KBRA implementation, which, as a connected action, is analyzed at a program-level. Uncertainty regarding TMDL and KBRA implementation is appropriately called out in statements throughout the Draft EIS/EIR (such as the ones cited in the comment). Effects determination statements for the No Action/No Project Alternative in Section 3.2 Water Quality and Section 3.4 Algae include an explicit acknowledgement that full attainment of the Oregon and California TMDLs would improve water quality but the implementation mechanisms and timing are unknown. The general assertion of uncertainty associated with respect to TMDL implementation made by the comment does not provide finer resolution than the statements already made in the Draft EIS/EIR.	
AO_LT_1230_071-62	Uncertainty is inherent to any analysis of future conditions, particularly in a system as complex as the Klamath Basin. The degree of uncertainty should always be considered as part of the decision-making process. The TMDLs themselves consider uncertainty when estimating the assimilative capacity of a water body and setting limits on the amount of pollution that can be added and still meet water quality standards; CWA Section 303(d) requires that TMDLs are established with a margin of safety to account for uncertainty. The Draft EIS/EIR has been prepared according to requirements of the NEPA and CEQA. Accordingly, assessments of the effects of the Proposed Action and alternatives on future water quality and algae conditions in the Klamath River involve comparison to both existing conditions	No

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	(CEQA) and future conditions (NEPA). Future conditions include "reasonably foreseeable actions" that are independent of FERC licensing and are expected to occur during the 50-yr period of analysis (2012 to 2061). With respect to water quality in the Klamath Basin, reasonably foreseeable actions include implementation of TMDLs for Oregon and California (see full list of reasonably foreseeable actions associated with water quality in Section 3.2.4.1, p. 3.2-25). Uncertainty is inherently associated with each of the reasonably foreseeable actions, including TMDL implementation, and does not eliminate the requirement to include these actions in the analyses. The same is true for KBRA implementation, which, as a connected action, is analyzed at a program-level. Uncertainty regarding TMDL and KBRA implementation is appropriately called out in statements throughout the Draft EIS/EIR (such as the ones cited in the comment). Effects determination statements for the No Action/No Project Alternative in Section 3.2 Water Quality and Section 3.4 Algae include an explicit acknowledgement that full attainment of the Oregon and California TMDLs would improve water quality but the implementation mechanisms and timing are unknown. The general assertion of uncertainty associated with respect to TMDL implementation made by the comment does not provide finer resolution than the statements already made in the Draft EIS/EIR.	
AO_LT_1230_071-63	The comment does not state whether PacifiCorp's concerns with the Klamath River TMDL model have any effect on the analysis leading to the significance call for water temperature in the lower Klamath River. The analysis in the Draft EIS/EIR (p. 3.2-51) states that water temperature objectives would not be met in the lower Klamath River downstream from Iron Gate Dam to Seiad Valley. Note that the reference to Seiad Valley is incorrect and has been corrected to the Salmon River in the Final EIS/EIR. If the TMDL model presents water temperature values that are biased too low, then there would be even less potential for water quality objectives to be met in this reach. This result would not change the No Action/No Project Alternative effects determination for water temperature.	Yes
AO_LT_1230_071-64	Master Response GEN-1 Comment Included as Part of the Record. Under a scenario of potential dam removal, it is likely that a greater diversity of salmon life histories will evolve, with some of those types more likely to avoid parasite exposure by migrating earlier or over wintering in tributaries and migrating in the fall (Bartholomew and Foott 2010; p. 40).	No

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AO_LT_1230_071-65	The scope of the Draft EIS/EIR does not extend to consideration of any possible future treatment mechanism that could be implemented to improve water quality in the Klamath Basin. Where specific statements are made in the TMDLs regarding other applicable water quality treatment strategies or where KHSA Interim Measures are established to test pilot-scale projects, these potential treatment strategies are included in the Draft EIS/EIR analysis. For example, with respect to nutrients, Section 3.2.4.3.1.3 (p.3.2-59) states the following: “The California Klamath River TMDL also indicates that “alternative pollutant load reductions and/or management measures or offsets that achieve the in-reservoir targets” are possible (NCRWQCB 2010a).” Section 3.2.4.3.1.4 of the Final EIS/EIR states the following: “The TMDL Action Plan includes a requirement for PacifiCorp to submit a proposed Implementation Plan that incorporates timelines and contingencies pursuant to the KHSA. PacifiCorp may propose the use of off-site pollutant reduction measures (i.e., offsets or “trades”) to meet the allocations and targets in the context of the Interim Measures 10 and 11 of the KHSA (NCRWQCB 2010a).” The Draft EIS/EIR incorrectly referred to the “Implementation Plan” as a “Reservoir Management Plan’; however, this has been corrected.	Yes
AO_LT_1230_071-66	A quantitative measure of TP sediment release is not necessary for the analysis. Further details are presented in Appendix C. The sentence in the referenced paragraph has been changed to the following: “On a seasonal basis, reservoir sediments can release bioavailable TP (as ortho-phosphorus), and to a lesser degree, bioavailable TN (as ammonium), to the water column during periods of seasonal hypolimnetic anoxia (see Section 3.2.3.4). While much of the TP released from anoxic reservoir sediments appears to remain within the hypolimnion until the reservoirs begin to turn over in the fall, some release can occur during late summer and fall months when it could stimulate in-reservoir algal blooms.”	Yes
AO_LT_1230_071-67	The following text in Draft EIS/EIR p.3.2-58 has been deleted from the Final EIS/EIR narrative: “Oregon water quality objectives for nuisance algae growth (Oregon Administrative Rule [OAR] 340-041-0019), or the."	Yes
AO_LT_1230_071-68	Change has been made.	Yes
AO_LT_1230_071-69	The comment does not state whether PacifiCorp’s concerns with the Klamath River TMDL model have any effect on the analysis leading to the No Action/No Project significance call for nutrients in the lower Klamath River. The comment author’s phrase “other	No

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	nitrogen related processes" is unnecessarily broad and is not accurate. Nitrogen terms included and not included in the Klamath River TMDL model are described in Tetra Tech (2009).	
AO_LT_1230_071-70	The significance statement in Draft EIS/EIR Section 3.2.4.3.1.4 (p. 3.2-63) states the following: "Existing seasonal dissolved oxygen levels in the Hydroelectric Reach are adverse. Full attainment of the Oregon and California TMDLs (implementation mechanism and timing unknown) would significantly increase dissolved oxygen. Continued impoundment of water at the Four Facilities under the No Action/No Project Alternative would result in no change from existing conditions." This is a different wording than the wording in the comment (the exact wording in the comment cannot be located in the Draft EIS/EIR), and this wording does not directly or indirectly state that the Project has detrimental effects on dissolved oxygen levels in J.C. Boyle Reservoir. On the contrary, Section 3.2.4.3.1.4 (p. 3.2-61) states the following: "In the Hydroelectric Reach, the seasonal variability in dissolved oxygen concentrations in J.C. Boyle Reservoir is highly influenced by the high oxygen demand of water flowing downstream from the upstream Keno Impoundment." No change is required.	No
AO_LT_1230_071-71	The PacifiCorp 2011 report on the results of turbine venting at Iron Gate Dam was not available in September 2011 when the Public Draft EIS/EIR was published. While the PacifiCorp report of 2010 turbine venting data is published as "September 2011", the PacifiCorp Web site indicates that it was not posted ("created") until the evening of 10/14/2011 and was modified on 10/24/2011 (see document properties). The 2008 results were reviewed as part of the analysis conducted for the Draft EIS/EIR; however, as stated in the text below, the 2008 results did not demonstrate that turbine venting at Iron Gate Dam is a viable long-term solution for improving dissolved oxygen, hence the language used in the Draft EIS/EIR Section 3.2.4.3.1.4. Since the 2010 results are now available, and they provide more detailed information regarding the possible benefits of turbine venting than the 2008 results, these results, along with those of 2008, have been summarized and added to Section 3.2.4.3.1.4 of the Final EIS/EIR, as follows: "Under the No Action/No Project Alternative, IM 3, Iron Gate Turbine Venting, as part of ongoing KHSA IM studies (see also Section 3.2.4.1), may be used to augment dissolved oxygen in the river downstream from the dam prior to 2020. Pilot study results from 2008 indicated that dissolved oxygen levels immediately downstream from Iron Gate Dam can be increased through the mechanical introduction of oxygen as water passes through the turbines (i.e., turbine venting). PacifiCorp reported an increase of approximately 0.5 to	Yes

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	2 mg/L dissolved oxygen (approximately 7 to 20 percent saturation) observed across August and October 2008 tests (Carlson and Foster 2008, PacifiCorp 2008a). However, during the October 2008 test, when the upstream reservoirs were de-stratifying and dissolved oxygen concentrations in the river immediately downstream from Iron Gate Powerhouse were decreasing to levels of approximately 6.5 mg/L, turbine venting only increased concentrations at this location by approximately 0.5 mg/L and 7 percent saturation (Carlson and Foster 2008). As part of their review of PacifiCorp's requested "Authorization for Incidental Take and Implementation of KHP Interim Operations Habitat Conservation Plan for Coho Salmon", USEPA indicated that the 2008 study did not demonstrate the efficacy of the proposed turbine venting to significantly improve dissolved oxygen downstream from Iron Gate Dam (USEPA 2011). Further testing conducted in 2010 indicated that turbine venting in combination with a forced air blower was the most effective of three methods tested (i.e., turbine venting, blower, turbine venting plus blower), resulting in an initial increase in dissolved oxygen percent saturation from approximately 50 percent to just over 70 percent immediately downstream from the Iron Gate Powerhouse (PacifiCorp Energy 2011). Throughout the 6-mile test reach downstream from the powerhouse, dissolved oxygen concentrations continued to increase for all tested methods, as well as for ambient (i.e., no treatment) conditions, due to river re-aeration. For the turbine venting plus blower treatment, dissolved oxygen concentrations achieved the reach-specific Basin Plan water quality objective of 90 percent saturation (i.e., October 1 through March 31 from Stateline to Scott River) at the end of the 6-mile test reach. Ambient conditions (i.e., no treatment) achieved approximately 88 percent saturation at the end of the 6-mile reach (PacifiCorp Energy 2011). Although turbine venting treatments considerably improved dissolved oxygen concentrations in the 6-mile test reach, particularly in the first 1 to 3 miles downstream from the dam, the full compliance point in the river with turbine venting did not shift considerably further upstream as compared with that of ambient conditions (i.e., no treatment). Thus, although there have been improvements from the initial tests, turbine venting efforts have not yet been demonstrated to be a viable long-term solution for dissolved oxygen impairment from the reservoirs."	
AO_LT_1230_071-72	The comment does not state whether PacifiCorp's concerns with the Klamath River TMDL model have any effect on the analysis leading to the significance call for dissolved oxygen in this reach. The analysis on p. 3.2-65 states that dissolved oxygen water quality objectives would not be met downstream from Iron Gate Dam to the Shasta River (RM 176.7) and during July–September	No

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	and from the Shasta River to approximately the Scott River (RM 143) from September–November. If the TMDL model presents dissolved oxygen values that are biased too high, then there would be even less potential for water quality objectives to be met in this reach. This result would not change the No Action/No Project Alternative effects determination for dissolved oxygen.	
AO_LT_1230_071-73	Clarifying text has been added to Section 3.2.4.1. regarding the use of existing water quality models for the analysis of the No Action/No Project Alternative, including a brief discussion of the review process for the California Klamath River TMDLs and the understanding that they are sufficiently reliable for the purpose in which they are used in the Klamath River Facilities EIS/EIR. In addition, as stated in Section 3.2.4.1.1 (p. 3.2-36, with respect to water temperature), “since no one existing model captures all of the elements analyzed for water temperature in this Klamath Facilities Removal EIS/EIR, where possible, model outputs are used in combination to assess similar spatial and temporal trends in predicted water temperature.” The same is true for the dissolved oxygen analysis (Section 3.2.4.1.4, p. 3.2-38 to 3.2-39) and for nutrients (Section 3.2.4.1.3, p. 3.2-37 to 3.2-38), where the latter primarily uses the results of an empirical analysis conducted by Asarian et al. (2010) rather than the TMDL model nutrient results (the TMDL model results are only used to assess general trends). Further, as presented in Section 3.2.4.3 Effects Determinations (p. 3.2-47 to 3.2-147), the Klamath River TMDL model results generally agree with the results of other numeric modeling efforts conducted in the Klamath Basin and cited in the Draft EIS/EIR. Lastly, the text regarding the “Reservoir Management Plan” has been changed to the following: “The TMDL Action Plan includes a requirement for PacifiCorp to submit a proposed Implementation Plan that incorporates timelines and contingencies pursuant to the KHSA. PacifiCorp may propose the use of off-site pollutant reduction measures (i.e., offsets or “trades”) to meet the allocations and targets in the context of the Interim Measures 10 and 11 of the KHSA (NCRWQCB 2010).”	Yes
AO_LT_1230_071-74	The low buffering capacity of the Klamath River is presented in Draft EIS/EIR Section 3.2.4.3.2.5 (p. 3.2-115) and Appendix C, C.5.2.1 (p. C-47). To further clarify, the following sentence from Appendix C has been added to Section 3.2.3.6. “Because the Klamath River is a weakly buffered system (i.e., has typically low alkalinity full attainment of the TMDLs within the period of analysis”.	Yes

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AO_LT_1230_071-75	The sentence has been corrected to read: "Under existing conditions, chlorophyll-a samples during summer and fall in Upper Klamath Lake and the two largest reservoirs at the Four Facilities (Copco 1 and Iron Gate Reservoirs) exhibit annual mean values >10 µg/L (measured May through October) with the highest values (> 100 mg/L) occurring in surface waters during late summer periods of intense algal blooms (see Section 3.2.3.7)."	Yes
AO_LT_1230_071-76	The use of the term "cyanotoxins" is not intended to suggest that there are data on multiple toxins in the Klamath River. The term "cyanotoxins" is only used on p. 3.2-70 in the following sentence "Lastly, there is emerging evidence that cyanotoxins flushing from coastal rivers into Monterey Bay, California were responsible for numerous sea otter deaths in 2007 (Miller et al. 2010)." The sentence accurately references the term used in the peer reviewed journal article. The only other use of the more general word "cyanotoxins" in Section 3.2 that doesn't already have further clarification is on p. 3.2-30 in the sentence "In 2010, the Klamath Hydroelectris Project reservoirs and the entire river downstream from Iron Gate Dam (including the estuary) were posted to protect public health due to elevated cyanobacteria cell counts and cyanotoxin concentrations." The parenthetical clarification "cyanotoxin (i.e., microcystin)" has been added to the Final EIS/EIR. The discussion on p. 3.2-70 stipulates summer months and refers the reader to Section 3.2.3.7 and Appendix C for more detail. Appendix C, Figure C-29 presents an inter-annual comparison of microcystin concentration for Copco 1 Reservoir and Iron Gate Reservoir during July through October 2005–2009. The Draft EIS/EIR describes the presence of *Microcystis aeruginosa* in Upper Klamath Lake in Section 3.2.3.7, p. 3.2-29. Similar text has been added to Section 3.4.3.3.1 to reiterate this fact: "*Microcystis aeruginosa* is believed to be responsible for the production of microcystin toxin in the lake, which has exceeded the World Health Organization (WHO) limit for drinking water (1 ug/L) and the Oregon Department of Public Health guidelines for issuing public health advisories (Section 3.2.3.7). Additional microcystin data collection in Upper Klamath Lake is ongoing (Vanderkooi et al. 2010, see Section 3.3, Aquatic Resources for more detail)."	Yes
AO_LT_1230_071-77	While existing data are not available at a sufficiently high temporal and spatial resolution to definitively determine *Microcystis aeruginosa* bloom dynamics from the Project reservoirs to lower reaches of the Klamath River, data from numerous reports cited in the Draft EIS/EIR indicate that algae and toxins are transported many miles downstream, and that this	Yes

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	process inoculates the river to the degree that localized growth of these blooms can occur. Data compiled from Fetcho (2010), Raymond (2010) and Kann et al. (2012) show that *Microcystis aeruginosa* blooms in Copco 1 and Iron Gate Reservoirs in mid-August 2010 through early October 2010 were transported from the reservoirs into the Klamath River. Algal cell counts and toxin levels in the Klamath River immediately downstream from Iron Gate Dam (River Mile [RM] 189.7) reflect water being discharged from Iron Gate Reservoir (RM 190.1) and tend to exhibit the highest concentrations of all the sites measured (see attached figure, note the units on the left-hand y-axis are cells/mL x 10). As the water moves downstream, algal cell concentrations are initially diluted (e.g., at Seiad Valley), and subsequently are conserved or decrease with distance downstream, with peak levels tending to occur at upstream locations before they occur at downstream locations. Inconsistencies in timing of cell density peaks in the summer/fall 2010 dataset are not unexpected given the low temporal resolution of the data (e.g., travel time in the river during late August is 2-3 days, while samples are taken approximately every 1-2 weeks), natural lateral and transverse mixing that would occur in the river, the growth and death of algal cells contained within an active bloom discharged to the river, and inputs and dilution of active cells and/or toxins from tributary flows. There is no solid evidence that *Microcystis aeruginosa* can thrive or self-propagate in the Lower Klamath River without an inoculum from reservoir releases. Isolated observations of algal toxins at concentrations higher in the Lower Klamath River than immediately downstream from Iron Gate Dam must be interpreted in the context of travel time from the dam, possible degradation of algal cells in the river environment that could increase dissolved toxin concentrations in the water, and potential sampling limitations. That said, we do recognize that blooms released from Iron Gate Reservoir may survive and grow slowly in the Lower Klamath River despite the generally inhospitable habitat conditions for *Microcystis aeruginosa*. Therefore, the italicized issue statement in Draft EIS/EIR Section 3.2.4.3.1.6 Lower Klamath River (p.3.2-70) has been changed to the following: “Continued impoundment of water at the Four Facilities could support long-term growth conditions for toxin-producing nuisance algal species such as *Microcystis aeruginosa*, resulting in high seasonal concentrations of chlorophyll-a and algal toxins (e.g., microcystin) transported into the Lower Klamath River and likely the Klamath Estuary and the marine near shore environment.”	

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	The supporting text has been modified to be the following, consistent with similar modifications to text in Section 3.4 Algae: "Existing information indicates that instances of elevated levels of *Microcystis aeruginosa* and microcystin toxin in the Klamath Estuary correspond with elevated levels measured at upstream locations in the Lower Klamath River (see also Section 3.4.3.6). Continued support of elevated *Microcystis aeruginosa* and microcystin toxin levels in the Lower Klamath River under the No Action/No Project Alternative would also likely result in continued support of elevated levels in the Klamath Estuary. Lastly, there is emerging evidence that cyanotoxins flushing from coastal rivers into Monterey Bay, California were responsible for numerous sea otter deaths in 2007 (Miller et al. 2010). While it is not known if conditions in Monterey Bay are similar to those in the Klamath River marine near shore environment, there may be potential for microcystin to adversely impact marine organisms under the No Action/No Project Alternative." The bolded impact statement in Draft EIS/EIR Section 3.2.4.3.1.6 has been changed to read as follows: "Existing transport of seasonal blooms of toxin-producing nuisance algal species, chlorophyll-a, and algal toxins into the Lower Klamath River and likely the Klamath Estuary are adverse. Transport to the marine near shore environment is potentially adverse."	
AO_LT_1230_071-78	The comment seems to make a distinction between liver in fish and "tissue"; by this we can only assume that the comment author defines tissue narrowly as muscle tissue or filets that would be eaten by humans. The Draft EIS/EIR takes a broader definition of "tissue" that could include organs such as liver, with detections as described by Kann et al. (2010). This definition is also consistent with the use of whole-fish for the reservoir fish contaminant sampling (CDM [2011b], Draft EIS/EIR Section 3.2.4.3.1.7), the fact that some populations cook or ingest whole fish, and the ecological consumption of whole fish by predators. The comment does acknowledge that microcystin has been detected in fish livers in the Lower Klamath River. Therefore, by the definition of "tissue" as used in the Draft EIS/EIR, the comment that "No microcystin has been found in fish tissue" is not accurate. No changes were made to the Draft EIS/EIR.	No
AO_LT_1230_071-79	While the comment refers to p. 3.2-76, which presents an analysis of water temperature in the J.C. Boyle bypass and peaking reaches under the Proposed Action, the comment does not state whether PacifiCorp's concerns with the Klamath River TMDL model have any effect on the analysis leading to the significance call for water temperature in this reach. With respect to the 20% reduction in solar energy, the comment does not	Yes

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	explain how this potential bias would change the TMDL model results such that the significance determination for water temperature in this reach would change. Regarding PacifiCorp's challenge to the California Klamath River TMDLs, clarifying text has been added to Section 3.2.4.1 regarding the use of existing water quality models for the analysis of the No Action/No Project Alternative, including a brief discussion of the review process for the California Klamath River TMDLs and the understanding that they are sufficiently reliable for the purpose in which they are used in the Klamath River Facilities EIS/EIR. In addition, as stated in Section 3.2.4.1.1 (p. 3.2-36, with respect to water temperature), "since no one existing model captures all of the elements analyzed for water temperature in this Klamath Facilities Removal EIS/EIR, where possible, model outputs are used in combination to assess similar spatial and temporal trends in predicted water temperature." The same is true for the dissolved oxygen analysis (Section 3.2.4.1.4, p. 3.2-38 to 3.2-39) and for nutrients (Section 3.2.4.1.3, p. 3.2-37 to 3.2-38), where the latter primarily uses the results of an empirical analysis conducted by Asarian et al. (2010) rather than the TMDL model nutrient results (the TMDL model results are only used to assess general trends). Further, as presented in Section 3.2.4.3 Effects Determinations (p. 3.2-47 to 3.2-147), the Klamath River TMDL model results generally agree with the results of other numeric modeling efforts conducted in the Klamath Basin and cited in the Draft EIS/EIR.	
AO_LT_1230_071-80	The statement regarding a decrease in 'long- term summer/fall water temperatures 3-6 ºC [5.4- 10.8 ºF]" does not appear to be in Draft EIS/EIR Section 3.2. There are multiple anticipated water temperature ranges under the Project alternatives given in the Draft EIS/EIR Section 3.2, depending on the model being described, season, and future conditions (i.e., TMDL implementation, climate change, dams in/dams out scenarios). As stated in the Draft EIS/EIR Section 3.2.4.1.1 (p. 3.2-36) and Appendix D, while the Klamath TMDL model provides numeric predictions that are useful for the water quality analysis, it does not address the potential long-term effects of global climate change on water temperatures in the Klamath Basin, nor does it include KBRA hydrology. The RBM10 model (Perry et al. 2011) includes both of these considerations in the model algorithms. The TMDL models are used as one of several lines of evidence for the Draft EIS/EIR analyses (see discussion below) and, in combination with other available models and empirical analyses, are sufficiently reliable as general predictors of future water	No

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	quality in the Klamath Basin. Water quality models are inherently complex, especially ones depicting a large and variable system such as the Klamath River. In the case of the California Klamath TMDL, a significant five-year effort was employed by the Regional Water Board in collaboration with PacifiCorp and working jointly with USEPA Region's 9 and 10, Oregon Department of Environmental Quality, and USEPA's contractor TetraTech on the modeling work for the TMDL. That work was subject to extensive peer review and public comment before the Regional Water Board adoption. It was further reviewed and subject to additional public comment before approved unanimously by the State Water Resources Control Board. It was then subsequently reviewed and approved by the U.S. Environmental Protection Agency.	
AO_LT_1230_071-81	While the comment refers to p. 3.2-110, which presents an analysis of dissolved oxygen under the Proposed Action, the comment does not state whether PacifiCorp's concerns with the Klamath River TMDL model have any effect on the analysis leading to the significance call for dissolved oxygen in the Klamath River immediately downstream from Iron Gate Dam for the Proposed Action or any of the alternatives. With respect to the 20% reduction in solar energy, the comment does not explain how this potential bias would change the TMDL model results such that the significance determination for dissolved oxygen in the DRAFT EIS/EIR would change. PacifiCorp states several times that it has brought a legal challenge to the TMDL and that it preserves its rights to challenge TMDLs in other proceedings. This comment is noted. The TMDL models are used as one of several lines of evidence for the DRAFT EIS/EIR analyses (see discussion below) and, in combination with other available models and empirical analyses, are sufficiently reliable as general predictors of future water quality in the Klamath Basin. Water quality models are inherently complex, especially ones depicting a large and variable system such as the Klamath River. In the case of the California Klamath TMDL, a significant five-year effort was employed by the Regional Water Board in collaboration with PacifiCorp and working jointly with USEPA Region's 9 and 10, Oregon Department of Environmental Quality, and USEPA's contractor TetraTech on the modeling work for the TMDL. That work was subject to extensive peer review and public comment before the Regional Water Board adoption. It was further reviewed and subject to additional public comment before approved unanimously by the State Water Resources Control Board. It was then subsequently reviewed and approved by the U.S. Environmental Protection Agency.	No

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	In general comment #4, p. 2 of its comment letter dated December 30, 2011, PacifiCorp objects to the incorporation of TMDL scenarios and modeling results into the No Action Alternative and other alternatives because of alleged flaws in TMDLs. PacifiCorp's main objection appears to be that TMDLs are "unrealistic and unattainable." (Comment letter, P. 2.) As noted on p. 2-17 of the Draft EIS/EIR, the No Action/No Project Alternative would include other regulatory conditions, including Oregon and California TMDLs. "The TMDLs within the basin are expected to result in improvements to water quality conditions but the improvements cannot be quantified due to uncertainties regarding the timing and magnitude of mitigation projects necessary to achieve water quality standards." (Draft EIS/EIR, p. 2-18.) Uncertainty regarding the extent of water quality improvements from TMDL implementation does not alter effects determinations for the Proposed Action and alternatives because multiple lines of evidence are used to make the effects determinations (see below discussion). No individual existing numeric model captures all of the long-term water quality conditions anticipated under the Proposed Action and the alternatives. Modeling conducted for the California Klamath River TMDLs provides long-term quantitative predictions for multiple water quality parameters in the Klamath River, assuming full implementation of TMDLs (except for water temperature), which is considered to be a reasonably foreseeable future action under NEPA. Other numeric models used for the long-term water quality analyses presented in the Draft EIS/EIR include the KRWQM developed by PacifiCorp for the Federal Energy Regulatory Commission relicensing process and the RBM10 water temperature model developed as part of the Secretarial Determination studies. These models are described in Section 3.2.4.1 (p. 3.2-33 to 3.2-42) and Appendix D of the Draft EIS/EIR. Results of water temperature modeling with respect to fish health conducted by Dunsmoor and Huntington (2006) (using the KRWQM results) are also cited numerous times in the water quality analysis (Section 3.2.4). As stated in Section 3.2.4.1.1 (p. 3.2-36, with respect to water temperature), "since no one existing model captures all of the elements analyzed for water temperature in this Klamath Facilities Removal EIS/EIR, where possible, model outputs are used in combination to assess similar spatial and temporal trends in predicted water temperature." The same is true for the dissolved oxygen analysis (Section 3.2.4.1.4, p. 3.2-38 to 3.2-39) and for nutrients (Section 3.2.4.1.3, p. 3.2-37 to 3.2-38), where the latter primarily uses the results of an empirical analysis conducted by Asarian et al. (2010) rather than the TMDL model nutrient results (the TMDL model results are only used to assess general trends). Further,	

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	as presented in Section 3.2.4.3 Effects Determinations (p. 3.2-47 to 3.2-147), the Klamath River TMDL model results generally agree with the results of other numeric modeling efforts conducted in the Klamath Basin and cited in the Draft EIS/EIR. Note that for the long-term dissolved oxygen analysis called out in this comment, the KRWQM results with respect to dissolved oxygen immediately downstream from Iron Gate Dam are presented along with the TMDL model results in Section 3.2.4.3.2.4 (p. 3.2-109 to 3.2-11).	
AO_LT_1230_071-82	The Draft EIS/EIR has been revised as follows: 'Although prolonged exposure to these high temperatures could be lethal during summer for some species, these temperatures generally remain within tolerance criteria for migrating adult anadromous salmonids during the periods when most migration would be expected to occur (Hamilton et al. 2011).' Under a scenario of potential dam removal, it is likely that a greater diversity of salmon life histories will evolve, with some of those types more likely to avoid parasite exposure by migrating earlier or over wintering in tributaries and migrating in the fall (Bartholomew and Foott 2010; p. 40). These life histories would also likely be able to avoid periods of poor water quality.	Yes
AO_LT_1230_071-83	The comment has taken the statement out of context. The referenced statement is contained within a section discussing potential effects on water temperature and other water quality parameters. Predation of juvenile salmonids is analyzed elsewhere in this section.	No
AO_LT_1230_071-84	The Hardy and Addley (2001) report is cited accurately. In addition, disease related mortalities of juvenile and adult salmonids have been documented in the Klamath River and major tributaries downstream from Iron Gate Dam in more recent years by the Klamath Fish Health Assessment Team (KFHAT 2005).	No
AO_LT_1230_071-85	The comment identified a necessary revision in the Draft EIS/EIR. To be technically correct, we have revised the text in the Final EIS/EIR. 'Klamath River salmonids are generally more tolerant of high water temperatures than salmonids from other basins (Federal Energy Regulatory Commission 2007, p. 3-314; Foott et al. 2012). Moreover, the Administrative Law Judge found that juvenile steelhead trout can withstand incrementally higher temperatures exceeding 22 C provided food is abundant and by finding thermal refuge or by living in areas where nocturnal	Yes

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	temperatures drop below the thermal threshold. (Administrative Law Judge 2006, at p. 19, FOF 2A-44).' Steelhead juveniles that originate in the Link River and Klamath River above J.C. Boyle may migrate downstream and go through smoltification in the lower river, thus avoiding potentially unsuitable temperatures. Under a scenario of potential dam removal, it is likely that a greater diversity of salmon life histories will evolve, with some of those types more likely to avoid parasite exposure by migrating earlier or over wintering in tributaries and migrating in the fall (Bartholomew and Foott 2010; p. 40). These life histories would also likely be able to avoid periods of poor water quality. While residualization is common in juvenile hatchery steelhead trout, there is an absence of evidence of high levels of residualization in juvenile naturally-spawned steelhead trout (Administrative Law Judge 2006 at p. 25, FOF 2C-8). Facilitating the movement of wild anadromous steelhead trout above Iron Gate Dam via prescribed fishways presents a low risk of residualization (a phenomenon most common among hatchery steelhead trout). Moreover, while resident trout have the genetic capacity to adopt anadromy, the risk of residualizing can be minimized through use of adaptive management (Administrative Law Judge 2006 at p. 87, UFOF 5).	
AO_LT_1230_071-86	The Bartholomew and Foott (2010) information was considered in the NEPA analysis and that analysis for each alternative has considered the requested information. As noted in the Draft EIS/EIR on p. 3.3-88 for Alternatives 2 and 3, increased variability in flows and the restoration of a more natural sediment regime, would likely reduce the suitability of habitat conditions for M. speciosa, the invertebrate host for P. minibicornis and C. shasta. The Draft EIS/EIR on p. 3.3-88 has been revised to cite Bartholomew and Foott (2010) in this regard. While overall, physical polychaete habitat in Reclamation's Klamath Project area would increase with the return of reservoirs to a riverine environment, the extent of suitable habitat is not likely to be as extensive in the current infectious zone because of the steeper gradient in the area bounded by the projects (Bartholomew and Foott (2010). In addition, because the KRBA provides flexibility to manage flows to respond to real-time climatic and biological conditions it is expected that this would create variability in flows and resulting habitat conditions and reestablish natural instability and disturbance of microhabitats	Yes

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	preferred by polychaetes (Bartholomew and Foott (2010). The Draft EIS/EIR on p. 3.3-88 has additionally been revised to cite Bartholomew and Foott (2010) in regard to these points as well. Finally, the Draft EIS/EIR has been revised to include the following: Restoration of the hydrologic function of the river system is paramount to creating habitat diversity and maintaining biophysical attributes of a river system (Stanford et al. 1996; Poff et al. 1997). Although implementation of Alternative 2 or 3 would not fully restore the natural hydrologic regime of the Klamath River, it would result in a flow pattern that mimics pre dam conditions, having greater intra- and inter-annual variability than exists today with the Klamath Dams in place (Hetrick et al. 2009). Implementation of the KBRA would provide flexibility to manage flows that respond to real-time climatic and biological conditions, thereby enhancing the diversity in flow and water temperature. Restoring these dynamic conditions in the Klamath River would create instability and disturbance in microhabitat conditions that we expect would reduce polychaete populations (Stocking and Bartholomew 2007) and presumably, reduce infection rates within polychaete populations (Hetrick et al. 2009). Master Response AQU-20 Bedload Sediment and Fish Habitat. In addition, we anticipate that the higher flows modeled under the KBRA during the late winter and spring months, when combined with tributary accretions below Keno Dam that are currently being regulated by PacifiCorp Project Dams, would increase the frequency of flows that mobilize sediment (Hetrick et al. 2009). The increases in sediment mobilization events are anticipated to have a positive effect on the aquatic environment. These benefits include decreasing the retention and stability of fines and the associated establishment of excessive aquatic vegetation, which is anticipated to adversely affect microhabitats occupied by polychaete worms (Manayunkia speciosa). As noted in the Draft EIS/EIR on p. 3.3-148 and 3.3-173, under Alternatives 4 and 5, disease impacts would be intermediate to those associated with Alternative 1 and Alternatives 2 (and 3).	
AO_LT_1230_071-87	PacifiCorp conducted a PHABSIM analysis for the bypass and peaking reaches but the results appear to be insensitive to changes in flow. However, the PHABSIM analysis conducted by PacifiCorp in the Klamath River reflects the results of a highly modified flow alteration and impacts on habitat. The Weighted Usable Area (WUA) relationships for rainbow trout presented by	No

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	PacifiCorp in their April 2005 addendum to the instream flow study are remarkably flat, indicating that microhabitat is unresponsive to changes in flow. The studies have limited utility in determining adequate flow needs for most life stages of trout and sucker. The problems with PacifiCorp's PHABSIM analysis are summarized in a Technical report submitted as an addendum to U.S. Department of the Interior (2006).	
AO_LT_1230_071-88	Additional text has been added to the Final EIS/EIR in Section 3.3.4 to clarify this point. The text has been modified to read: Neither implementation of TMDLs nor climate change was incorporated into the existing models, including the Chinook salmon life cycle model (EDRRA) developed by Hendrix (2011).	Yes
AO_LT_1230_071-89	The comment claims that the cited statement on p. 3.3-152 contradicts the assertion that it is the density of spawners that affect myxospores. In this regard, on 3.3-152 of the Draft EIS/EIR the section that read "a small proportion of spawning salmon produce the bulk of myxospores" has been replaced with 'while the percentage of adult carcasses with myxospores (parasite stage that infects the polychaete host) is relatively low, there is a direct relationship between carcass number and quantity of myxospores in the system (Scott Foott, U.S. Fish and Wildlife Service, pers. comm.).' Bartholomew and Foott (2010) state on p. 12 that the spatial overlap of both hosts is a key factor in predicting where parasite abundance would be increased, and the formation of an infection nidus between the Shasta River and Indian Creek could be explained by a high concentration of spawning adult salmon in the reach below the dam, which provides myxospores to infect the dense polychaete populations in the reach below. The Federal Energy Regulatory Commission's analysis is that restoring access to reaches above Iron Gate Dam for anadromous fish would allow adult fall Chinook salmon to distribute over a greater length of the river, reducing crowding and the concentration of disease pathogens that currently occur in the reach between Iron Gate Dam and the Shasta River (Federal Energy Regulatory Commission 2007). P. 3.3-88 of the Draft EIS/EIR, Alternative 2, Fish Disease and Parasites, has been revised to add this text from the Federal Energy Regulatory Commission. Alternatives 4 and 5 will likewise be revised. This comment further states that data are not provided to support assertions in the Draft EIS/EIR that factors such as nutrient levels	No

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	affect the incidences of *C. shasta.* With respect to nutrient levels, a summary of all existing poor water quality in the Upper Klamath Basin is described in the Draft EIS/EIR Section 3.2.3.1 Existing Conditions (p. 3.2-19 to 3.2-33). Additional details are provided in Appendix C (p. C-1 to C-86). The presence and operation of the Four Facilities affect many aspects of water quality in the Klamath River, including slower transport of water downstream, interception and retention of sediment, organic matter, nutrients, and other constituents that would otherwise be transported downstream, and alteration of seasonal water temperatures when compared to free-flowing stream reaches. In this regard, Cladophora, a periphytic green algae, provides habitat for the polychaete intermediate host. Increases in Cladophora are likely to foster *C. shasta* by providing habitat for its intermediate host, while decreases in Cladophora reduce habitat for the intermediate host and thus interrupt the *C. shasta* life cycle. Cycling of dissolved nitrogen and phosphorus from upstream sources can affect growth of Cladophora. In the short term, dam removal is likely to increase total nutrient concentrations during drawdown by release of particulate (primarily organic) nitrogen and phosphorus that is currently processed and stored by planktonic algae and in sediment in the reservoirs (see Section 3.2.4.3.2.3 Nutrients). However, the drawdown would occur during winter months when rates of primary production and microbially mediated nutrient cycling would be low. Furthermore, this sediment pulse would be accompanied by considerable physical abrasion from the sediment, and reduced light penetration in water, so the potential for nutrient uptake and algal growth from TN and TP released with sediment deposits is therefore expected to be a less-than-significant impact (Section 3.2.4.3.2.3 and Section 3.4.4.3.2) Over the longer term, the concentrations and forms of nutrients entering the lower river would be determined primarily by releases from Keno Impoundment/Lake Ewauna; these would represent increases in total annual nutrient loads entering the lower river although there may be seasonal periods, such as late summer and fall, when loading or concentrations are less than current conditions. In the absence of other factors this could increase the growth of Cladophora and possibly increase the prevalence of *C. shasta*. However, dam removal would also create other conditions that tend to offset the effect of nutrient increases on the growth of Cladophora. For example, in-river retention (assimilative uptake, recycling, and denitrification) is expected to reduce nutrient concentrations longitudinally downstream during the growing season, resulting in net retention that may be of a similar order of	

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	magnitude as currently provided by reservoir and riverine processes. Furthermore, growth of periphyton including Cladophora in the river upstream of Orleans is likely not currently limited by nutrients, implying that increases or even slight decreases in nutrient concentrations may not result in changes in periphytic biomass or species assemblages. Nutrient spiraling (uptake and subsequent release) could cause a downstream extension of elevated nutrient concentrations in late summer that might result in changes in species composition (e.g. a shift to more Cladophora or an increase in other species) but this level of detail remains highly uncertain (EIS/EIR 3.4.4.3.2). Other offsetting factors include reduced fall temperatures, a more mobile river bed, variable flows, and progress toward achievement of TMDL targets. The net long term effect of dam removal is a likely a slight- to moderate decrease in Cladophora because conditions favorable for its growth would be reduced (EIS/EIR 3.4.4.3.2). This would decrease habitat for the intermediate host which would reduce the incidence of *C. shasta*. The removal of Iron Gate Dam would also remove a major barrier to fish migration, reducing the concentration of spawners and carcasses that presently occur downstream from the dam. Greater dispersal would reduce their proximity to dense populations of polychaetes (EIS/EIR 3.3.4.3). The complex interaction of competing factors, such as likely long term increases in nutrient concentrations due to dam removal with long term nutrient decreases from implementation of TMDLs, and changes in sediment mobility, provides inherent uncertainty in the prediction of periphytic growth following dam removal. The determination that periphyton growth in the Hydroelectric Reach would be significant (Section 3.4.4.3.2) is therefore considered a conservative assessment. The other factors listed here and in Section 3.3 provide many reasons why salmon mortality from *C. shasta* or other diseases is expected to be reduced by the Proposed Action, despite potential increases in periphytic growth. The No Action alternative was most likely to perpetuate the current *C. shasta* and *P.minibicornis* problems and other disease issues because it perpetuates the factors that contribute to high infection rates (EIS/EIR 3.3.4.3). Master Response AQU-28 FERC Conclusions for Disease. P. 3.3-58 of the Draft EIS/EIR, Alternative 1, Fish Disease and Parasites, has been revised to add this text (Master Response AQU-28) from the Federal Energy Regulatory Commission.	

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AO_LT_1230_071-90	Additional language outlining NOAA Fisheries Services's Coho Recovery Plan, Basin-wide restoration projects, and other basin conservation plans has been added. Chapter 2 identifies the IMs that are part of the No Action/No Project Alternative because they have already been implemented or would be implemented regardless of the Determination. However, many of these IMs would not result in environmental effects. The Aquatic Resources Section only analyzes the IMs that would affect that resource.	Yes
AO_LT_1230_071-91	As noted in the Draft EIS/EIR on p. 3.2-82, more recent temperature modeling has been completed (Perry et al. 2011). These results also indicate that, "despite warming of water temperatures under climate change, the primary effect of dam removal is still anticipated be the return of approximately 160 miles of the Klamath River, from J.C. Boyle Reservoir (RM 224.7) to the Salmon River (RM 66), to a natural thermal regime (Perry et al. 2011). Model results indicate that the annual temperature cycle downstream from Iron Gate Dam would shift forward in time by approximately 18 days under the Proposed Action (Perry et al. 2011)."	No
AO_LT_1230_071-92	This comment refers to Hendrix (2011) and not the larger discussion of temperature on TMDLs. This larger discussion is now found in the Water Quality Section now labled 3.2.4.3.1.1. A description of the assumptions and methodologies that are included in the Chinook salmon life cycle model are presented in Hendrix (2011). Additional text has been added to the Final EIS/EIR in Section 3.3.4 stating that neither implementation of TMDLs or climate change are included in the Chinook salmon life cycle model (EDRRA) developed by Hendrix (2011).	Yes
AO_LT_1230_071-93	The Draft EIS/EIR on p. 3.3-56 has been revised to state that: 'Under the No Action/No Project Alternative, the temperature in the Upper Klamath River would remain similar to existing conditions in the near term, but would be expected to show a gradual cooling trend through implementation of the TMDLs. However, climate change may offset temperature improvements.' On p. 3.3-58 the Draft EIS/EIR has been revised to state that "In addition to direct thermal stress, continued elevated water temperatures in the late summer/fall (due to climate change's expected offset of anticipated TMDL temperature improvements) could result in indirect stressors on salmonids including an increased intensity and duration of algal blooms, decreased dissolved oxygen levels, and increased parasite abundance.	Yes

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	These effects could adversely impact cold-water fish communities and may be be deleterious to warm-water fish communities as well."	
AO_LT_1230_071-94	As noted in Bartholomew and Foott (2010, p. 7), the size of the infectious zone and the magnitude of parasite densities change seasonally and annually.	No
AO_LT_1230_071-95	Master Response AQU-28 FERC Conclusions for Disease. Bartholomew and Foott (2010) and on p. 2 of Foott et al. (2011) describe the factors associated with determining a region of high infectivity to salmonid fishes as follows: "Disease occurs when the following parameters coincide: • microhabitats with low velocity, stable flows (high density polychaete habitat) • high numbers of spawning adult salmon (myxospore input) • temperatures above 15°C (increases rate of disease in fish)" Bartholomew and Foott (2010) state on p. 11 that slow flowing habitats such as runs and eddy-pools had the highest relative densities and frequency of occurrence of *M. speciosa*. The restoration of variable flow conditions as a result of dam removal is expected to result in a dynamic flow regime that would decrease the stability of the microhabitats that support polychaete populations and thus decrease polychaete abundance in the infectious zone (Stocking and Bartholomew 2007). Additionally, Bartholomew and Foott (2010) state that because the KBRA provides flexibility to manage flows to respond to real-time climatic and biological conditions they expect that this would create variability in flows and resulting habitat conditions and reestablish natural instability and disturbance of microhabitats preferred by polychaetes (Bartholomew and Foott 2010; p. 21). As noted in the Draft EIS/EIR on p. 3.3-88 for Alternatives 2 and 3, increased variability in flow management, and the restoration of a more natural sediment regime, would likely reduce the suitability of habitat conditions for *M. speciosa,* the invertebrate host for *P. minibicornis* and *C. shasta*. The Draft EIS/EIR on p. 3.3-88 has been revised to cite Stocking and Bartholomew (2007) and Bartholomew and Foott (2010). In regard to the effects of spawner abundance on *C. shasta*, Bartholomew and Foott (2010) state on p. 12 that the spatial overlap of both hosts is a key factor in predicting where parasite	No

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	abundance will be increased, and the formation of an infection nidus could be explained by a high concentration of spawning adult salmon [meaning carcasses] in the reach below the dam, which provides myxospores to infect the dense polychaete populations in the reach below. The FERC's additional analysis is that restoring access to reaches above Iron Gate Dam for anadromous fish would allow adult fall Chinook salmon to distribute over a greater length of the river, reducing crowding and the concentration of disease pathogens that currently occur in the reach between Iron Gate Dam and the Shasta River (Federal Energy Regulatory Commission 2007). P. 3.3-88 of the Draft EIS/EIR, Alternative 2, Fish Disease and Parasites, has been revised to add this text from the Federal Energy Regulatory Commission. Alternatives 4 and 5 will likewise be revised. Continued Project operations would continue these ideal conditions for juvenile salmon disease. Removal of one or more of the mainstem dams could reduce the incidence of fish disease in the Klamath River downstream from Iron Gate Dam through several potential mechanisms Federal Energy Regulatory Commission 2007, p 3-313).	
AO_LT_1230_071-96	This comment on the EIS/EIR refers to the exposure of salmon to maximum temperatures that may reach 25 °C above Keno Dam during summer and the potential lethal effects of these temperatures. Although prolonged exposure to these high temperatures could be lethal during summer for some species, with seasonal trap and haul around Keno Reservoir, these temperatures generally remain within tolerance criteria for migrating adult fall Chinook (Hamilton et al. 2011). Migration timing of spring-run Chinook and anadromous *O.mykiss* currently would occur during periods suitable to avoid poor water temperature in Keno Reservoir. Under a scenario of potential dam removal, it is likely that a greater diversity of salmon life histories would evolve, with some of those types more likely to avoid parasite exposure by migrating earlier or over wintering in tributaries and migrating in the fall (Bartholomew and Foott 2010; p. 40). These life histories would also likely develop to avoid periods of poor water quality and take advantage of optimal water temperatures as they have in the Snake River (Conner et al. 2005). It is possible that some fall-run Chinook salmon juveniles would spend their first winter in UKL and resume emigration the following spring at age 1, as they do in Snake River reservoirs (Connor et al. 2005).	No

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	At present ambient air temperatures currently can produce daily average temperatures near 26°C below Iron Gate Dam during summer months (P. Zedonis, Service, pers. comm. in Hamilton et al. 2011) yet salmon runs continue in the lower river because the fish use thermal refugia and generally migrate when temperatures are cooler. The life history of many wild fall-run Chinook salmon in the lower river does not include occupancy of the mainstem Klamath when temperatures are at their peak.	
AO_LT_1230_071-97	The comment on the Draft EIS/EIR refers to Section 3.3.4.3, p. 3.3-65, second paragraph. The entire paragraph is "Under the No Action/No Project Alternative, upstream-migrating adult coho salmon would continue to be exposed to high water temperatures and poor water quality in the mainstem Klamath River, which can cause physiological stress, delay migration, reduce coldwater refugia, and increase mortality from disease. Low flows and increased sedimentation in tributaries can create barriers at the mouths of spawning streams, which would reduce spawning habitat area and production under the No Action/No Project Alternative in some years." As noted in Section 3.3.4.3, the current phase shift and lack of temporal temperature diversity associated with the No Action Alternative would persist, including current warm temperatures in late summer and fall (Hamilton et al. 2011). Adult salmon migrating later in the year would continue to experience warm temperatures in late summer and fall that could be deleterious to health and survival, including increased risk of disease, and high rates of delayed spawning and prespawn mortality (Hetrick et al. 2009). Because coho are fall spawners and these high temperatures persist through the end of December, it is reasonable to conclude that upstream-migrating adult coho salmon would continue to be exposed to high water temperatures. The comment as written does not provide the available scientific information that suggests that Klamath River temperatures do not pose a significant impact to coho.	No
AO_LT_1230_071-98	While the area of significant sediment release and resupply under the dam removal Alternatives is about eight miles below the current location of Iron Gate Dam and above the current infectious zone for juvenile salmon, Shasta R. to Seiad (Bartholomew and Foott 2010), sediment transport rates would increase downstream from this point as well (Blair Greimann, BOR, pers. comm.). Since the construction of the lower four PacifiCorp Dams, there has been approximately 3.6 million tons	Yes

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	of deposition within these reservoirs. The deposit is approximately 15% sand and 85% silt and clay (Reclamation, 2012d). The sand portion of this deposit would have been transported through the downstream reaches had not the dams been in place. After dam removal, this natural sediment supply of sand, silt, and clay would be restored to the reaches downstream from Iron Gate and also to all the reaches downstream. This increased movement and transport of sediment (sand, silt, and clay) would disrupt polychaete habitat from the current location of Iron Gate Dam to downstream from Shasta River. The Federal Energy Regulatory Commission (2007) concluded that restoring natural sediment transport processes would likely contribute to the scour of attached algae downstream from the current site of Iron Gate Dam, and deposited gravel and sand would provide a less favorable substrate for attached algae because of its greater mobility during high flow events than the existing armored substrate. The reduction in attached algae would provide less habitat for the polychaete intermediate host of C. shasta and P. minibicornis, which should reduce the infection rate of juvenile salmonids downstream from Iron Gate Dam (Federal Energy Regulatory Commission 2007, p3-314). The Draft EIS/EIR Section on ‘Bedload Sediment, Lower Klamath River: Downstream from Iron Gate Dam’ on p. 3.3-84 has been revised as follows: Under the Proposed Action, the flow magnitude required to mobilize sediment would decrease from existing conditions. Reclamation (2012d) estimated the magnitude and return period of flows required to mobilize sediment downstream from Iron Gate Dam 50 years after dam removal using reach averaged, predicted grain sizes from long-term SRH-1D simulations. The estimates show that under the Proposed Action, sediment mobilization flows from Bogus Creek to Willow Creek and from Willow Creek to Cottonwood Creek would range from 3,000 to 7,000 cfs (1.5 to 2.5 year return period) and 5,000 to 9,000 cfs (1.5 to 3.2 year return period), respectively, lower than existing conditions or the No Action/No Project Alternative (see Figure 3.3-4). Downstream from the Shasta River, there would be no significant difference in the flow required to mobilize the bed because the bed elevations of this reach are primarily controlled by relatively immobile large cobbles, boulders, and bedrock. Sediment is expected to quickly move through the reach with or without dam removal. However, there is expected to be higher transport of sand, silt, and clay transport through this reach because of the removal of the PacifiCorp Dams. Since the	

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	construction of the lower four PacifiCorp Dams, there has been approximately 3.6 million tons of deposition within these reservoirs. The deposit is approximately 15 percent sand and 85 percent silt and clay (Reclamation, 2012d). The sand, silt, and clay portion of this deposit would have been transported through the downstream reaches had not the dams been in place. After dam removal, this natural sediment supply of sand, silt, and clay would be restored to the reaches downstream from Iron Gate and also to all the reaches downstream. The Draft EIS/EIR on p. 3.3-87, Alternative 2, section on Fish Disease and Parasites has also been revised to explain this. The current infectious zone is the result of the synergistic effect of numerous factors (Federal Energy Regulatory Commission 2007; Bartholomew and Foott 2010; Hamilton et al. 2011). Reestablishment of natural flow and sediment transport rates to the river downstream from the current location of Iron Gate Dam would restore natural geomorphic channel forming processes to the river (Hetrick et al. 2009) which would make this synergy unlikely. The Chinook Expert Panel assessment indicated that dams out plus KBRA implementation (Alternative 2 or 3) offers greater potential than the Current Conditions in improving conditions for disease, (Goodman et al. 2011; p. 12).	
AO_LT_1230_071-99	The Conceptual Model for Disease Effects in the Klamath River (Foott et al. 2011) clearly states that "..flow is likely to have a strong effect on the stability of polychaete populations and thus on disease. Flow levels considered to have an effect on disease are those that will result in bed mobilization that would release fine material trapped in gravel and rework channel features (page 7). While the area of significant sediment release and resupply under the dams out Alternatives is above the current infectious zone for juvenile salmon, Shasta R. to Seiad (RM 130) (Bartholomew and Foott 2010), sediment transport rates would increase downstream from this point as well (Blair Greimann, BOR, pers. comm.). Since the construction of the lower four PacifiCorp Dams, there has been approximately 3.6 million tons of deposition within these reservoirs. The deposit is approximately 15% sand and 85% silt and clay (Reclamation, 2012d). The sand portion of this deposit would have been transported through the downstream reaches had not the dams been in place. After dam removal, this natural sediment supply of sand, silt, and clay would be restored to the reaches downstream from Iron Gate Dam and also to all the reaches downstream.	Yes

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	The FERC (2007) concluded that restoring natural sediment transport processes would likely contribute to the scour of attached algae downstream from the current site of Iron Gate Dam (IGD), and deposited gravel and sand would provide a less favorable substrate for attached algae because of its greater mobility during high flow events than the existing armored substrate. The reduction in attached algae would provide less habitat for the polychaete intermediate host of C. shasta and P. minibicornis, which should reduce the infection rate of juvenile salmonids downstream from IGD. (Federal Energy Regulatory Commission 2007, p3-314). As discussed in Foott et al. 2011, the infectious zone may have unique bed movement properties that require higher flows to mobilize D50 particles than reaches below it (B. Greimann, January 10, 2011 Chinook Tech. Workgroup presentation in Foott et al. 2011). Nevertheless, increased movement and transport of sediment of the size discussed above (sand, silt, and clay) would still disrupt polychaete habitat from the current location of Iron Gate Dam to downstream from Shasta River. The current infectious zone is the result of the synergistic effect of numerous factors (Federal Energy Regulatory Commission 2007; Bartholomew and Foott 2010; Hamilton et al. 2011). Reestablishment of natural flow and sediment transport rates to the river downstream from the current location of Iron Gate Dam would develop natural geomorphic channel forming processes to the river (Hetrick et al. 2009) which would make this synergy unlikely. The Draft EIS/EIR Section on 'Bedload Sediment, Lower Klamath River: Downstream from Iron Gate Dam' on p. 3.3-84 has been revised as follows: Under the Proposed Action, the flow magnitude required to mobilize sediment would decrease from existing conditions. Reclamation (2012d) estimated the magnitude and return period of flows required to mobilize sediment downstream from Iron Gate Dam 50 years after dam removal using reach averaged, predicted grain sizes from long-term SRH-1D simulations. The estimates show that under the Proposed Action, sediment mobilization flows from Bogus Creek to Willow Creek and from Willow Creek to Cottonwood Creek would range from 3,000 to 7,000 cfs (1.5 to 2.5 year return period) and 5,000 to 9,000 cfs (1.5 to 3.2 year return period), respectively, lower than existing conditions or the No Action/No Project Alternative (see Figure 3.3-4). Downstream from the Shasta River, there would be no	

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	significant difference in the flow required to mobilize the bed because the bed elevations of this reach are primarily controlled by relatively immobile large cobbles, boulders, and bedrock. Sediment is expected to quickly move through the reach with or without dam removal. However, there is expected to be higher transport of sand, silt, and clay transport through this reach because of the removal of the PacifiCorp Dams. Since the construction of the lower four PacifiCorp Dams, there has been approximately 3.6 million tons of deposition within these reservoirs. The deposit is approximately 15 percent sand and 85 percent silt and clay (Reclamation, 2012d). The sand, silt, and clay portion of this deposit would have been transported through the downstream reaches had not the dams been in place. After dam removal, this natural sediment supply of sand, silt, and clay would be restored to the reaches downstream from Iron Gate Damand also to all the reaches downstream. The Draft EIS/EIR on p. 3.3-87, Alternative 2, section on Fish Disease and Parasites has also been revised to explain this. The Chinook Expert Panel assessment indicated that dams out plus KBRA implementation (Alternative 2 or 3) offers greater potential than the Current Conditions in improving conditions for disease, (Goodman et al. 2011; p. 12).	
AO_LT_1230_071-100	The effects of Proposed Action on water temperature in the lower Klamath River are described in the Draft EIS/EIR Section 3.2.4.3.2.1 (p. 3.2-80 to 3.2-83). Model results from PacifiCorp's KRWQM (see Draft EIS/EIR Figures 3.2-5 to 3.2-7 for water temperature projections at three locations in the lower Klamath River), the California Klamath River TMDLs model, and the RBM10 model (Perry et al. 2011) are described in detail for the Lower Klamath Basin. The results all generally agree that effects of Project reservoirs are greatest just downstream from Iron Gate Dam (RM 190.1), dampened by the confluence with the Scott River (RM 143.9), and mostly ameliorated by RM 66 at the confluence with the Salmon River. The comment states that Project dams mitigate summer peak temperatures, which decreases stress on salmonids. We agree that the Proposed Action would result in greater maximum temperatures during the warmest part of the summer. However, the Proposed Action would increase natural temperatures fluctuations in the reach below Iron Gate Dam thermally influenced by the Project and result in lower minimum water temperatures. With climate change, minimum water temperatures would become increasingly important for salmonids. Appropriate	No

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	minimum temperatures provide rearing anadromous fish with relief from thermal stress during the summer diurnal temperature cycle. An increase in minimum temperatures may adversely affect Chinook that are at their limit of thermal tolerances (NRC 2004). Minimum daily temperatures likely dictate forays of rearing fish away from refugia to feed. Current Project management and summer flows from IGD would continue to increase July and August minimum temperatures by reducing the effects of nocturnal cooling (Figure 8; (NRC 2004). Natural fluctuations in daily temperatures would also provide some additional thermal refuge for salmonids during the evening and early morning hours in summer. FERC (2007) states that the increase in average and maximum daily temperatures may be compensated for by lower temperatures at night, which NRC (2004) concludes may allow rearing fish to move out of temperature refugia to forage, allowing growth to occur even when ambient temperatures are above optimal. These fluctuations are more natural than the constant temperatures in waters released from the reservoirs, and fish may therefore be better adapted for these conditions. Under a scenario of potential dam removal, it is likely that a greater diversity of salmon life histories would evolve, with some of those types more likely to avoid parasite exposure by migrating earlier or over wintering in tributaries and migrating in the fall (Bartholomew and Foott 2010; p. 40). These life histories would also likely develop to avoid periods of poor water quality.	
AO_LT_1230_071-101	The EIS/EIR has been revised to state that 'The removal of the Four Facilities would be likely to reduce habitat quality for the polychaete host by reducing reservoir water quality effects, and restoring seasonal flow patterns and sediment dynamics that reduce the stability of the host's favored habitats (Federal Energy Regulatory Commission 2007; Hetrick et al. 2009; Hamilton et al. 2011). In regard to Figure 2. 4 in Bartholomew and Foott (2010) the report also states that parasite abundance (i.e., actinospore stage) is low at the outflow of Iron Gate Reservoir but increases in the main stem Klamath between the Interstate 5 bridge (I-5) and the confluence of the Scott River. This general pattern has remained stable, but the size of the infectious zone and the magnitude of parasite densities change seasonally and annually (Bartholomew and Foott 2010; p. 7). Master Response AQU-28 FERC Conclusions for Disease.	Yes

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	Below IGD the current stable flows, substrate composition, concentration of carcasses, decreased thermal diversity, and plankton rich discharge from reservoirs have created ideal conditions for disease (Hetrick et al. 2009; Hamilton et al. 2011, Table 3). Continued Project operations would continue these ideal conditions for juvenile salmon disease. Removal of one or more of the mainstem dams could reduce the incidence of fish disease in the Klamath River downstream from Iron Gate Dam through several potential mechanisms (Federal Energy Regulatory Commission 2007, p 3-313).	
AO_LT_1230_071-102	The conclusion that flows would be more favorable to salmonids in Reclamation's Klamath Project reaches is a general conclusion based on review of the available information, and not based solely on the results of the BLM trout study. Rather, it is a conclusion that considered the BLM flow study (DOI Bureau of Land Management 2002), PacifiCorp flow studies (PacifiCorp 2004c), agency review of those studies (U.S. Department of the Interior 2006), and the Administrative Law Judge finding regarding project flow operations (Administrative Law Judge (2006); p. 87 #14) which stated: "Current Project operations, particularly sediment blockage at the J.C. Boyle Dam, the flow regime, and peaking operations, negatively affect the redband trout fishery."	No
AO_LT_1230_071-103	Master Response AQU-11 NOAA Fisheries Service BO, ESA and KBRA Water Management.	No
AO_LT_1230_071-104	The comment has identified a part of the EIS/EIR that needs to be clarified. The Federal Energy Regulatory Commission (2007) citation has been added to the subject paragraph consistent with the text from the FERC Final EIS/EIR: The Federal Energy Regulatory Commission (2007) concluded that restoring natural sediment transport processes would likely contribute to the scour of attached algae downstream from the current site of IGD, and deposited gravel and sand would provide a less favorable substrate for attached algae because of its greater mobility during high flow events than the existing armored substrate. The reduction in attached algae would provide less habitat for the polychaete intermediate host of C. shasta and P. minibicornis, which should reduce the infection rate of juvenile salmonids downstream from IGD. (Federal Energy Regulatory Commission 2007, p3-314).	Yes
AO_LT_1230_071-105	The cited text in the Draft EIS/EIR does not state that *Anabaena spp.* blooms are consistent, merely that they occur. It also does not compare the bloom frequency or magnitude against that of	Yes

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	any other algae, including Aphanizomenon. No change is warranted in the Draft EIS/EIR on the topic of *Anabaena spp.* occurrence. The comment is correct that testing to date has not detected toxins from Anabaena; however, the potential for anatoxin producing *Anabaena spp.* cannot be ruled out given the limited sampling done under the Klamath Hydroelectric Settlement Agreement (KHSA) IM-15 monitoring in 2010 and 2011. The text of the Draft EIS/EIR does not claim that these toxins have been detected. However, the text has been revised to indicate that this cyanobacterium has the capability to produce toxins, but that it is unknown if it does in Klamath system.	
AO_LT_1230_071-106	The word "likely" has been removed.	Yes
AO_LT_1230_071-107	The sentence just after the one cited in the Draft EIS/EIR already provides the requested information: “Specifically, it appears that mobilization of phosphorus (e.g., from agriculture and other nonpoint sources) has pushed the lake from a naturally eutrophic state into its current hypereutrophic state, allowing algal blooms to reach or approach their theoretical maximum (Walker 2001).” Additional discussion of the Upper Klamath Lake shift from a naturally eutrophic state to its current hypereutrophic state has been added to Section 3.2 and Appendix C Section C.3.	Yes
AO_LT_1230_071-108	Change made.	Yes
AO_LT_1230_071-109	There is no solid evidence that *Microcystis aeruginosa* can thrive or self-propagate in the Lower Klamath River without an inoculum from reservoir releases. Isolated observations of algal toxins at concentrations higher in the Lower Klamath River than immediately downstream from Iron Gate Dam must be interpreted in the context of travel time from the dam, possible degradation of algal cells in the river environment that could increase dissolved toxin concentrations in the water, and potential sampling limitations. We do recognize that blooms released from Iron Gate Reservoir may survive and grow slowly in the Lower Klamath River despite the generally inhospitable habitat conditions for *Microcystis aeruginosa*. Therefore, the first paragraph in Section 3.4.3.5.1 has been changed to read as follows: “Although both *Aphanizomenon flos-aquae* and *Microcystis aeruginosa* have been observed just downstream from Iron Gate Dam and as far downstream as the Klamath Estuary, this reach of the river does not provide optimal habitat for phytoplankton species that typically thrive in reservoir and lake environments. As discussed	Yes

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	above, data collected in 2005 and 2007-2010 suggest that the phytoplankton composition of river sites immediately downstream from Copco 1 and Iron Gate Reservoirs can become dominated by blue-green algae on a seasonal basis, when large blooms occurring in the upstream reservoirs are transported downstream to river locations. Further downstream in the lower Klamath River, *Aphanizomenon flos-aquae* and *Microcystis aeruginosa* are generally documented at lower abundances (Kann and Asarian 2006, Raymond 2008), although in some years (e.g., 2007) abundance of *Microcystis aeruginosa* can be relatively greater at sites in the lower Klamath River than those immediately downstream from Iron Gate Dam (Raymond 2008). In general, turbulent mixing, increased velocity, and tributary dilution result in the gradual removal of suspended algal materials and chlorophyll-a from the water column as the river travels downstream (Armstrong and Ward 2008, Ward and Armstrong 2010) (see also discussion in Appendix C.2.2.1 and C.6.2.1). However, shorelines and protected coves and backwaters in the lower Klamath River can support summer and fall accumulations of blue-green algae including *Microcystis aeruginosa* (Kann and Corum 2006), and these accumulations can result in exceedance to the SWRCB/OEHHA Public Health Threshold (40,000 cells/mL) and WHO guidelines for *Microcystis aeruginosa* cell density (20,000 cells/mL)." Additionally, the text in this section has been revised to read as follows: "Algal toxins are a critical concern in the Klamath River downstream from Iron Gate Dam because they can remain viable along the low-velocity margins of the river where little mixing occurs (Kann and Corum 2009). Concentrations of microcystin toxin in the Klamath River downstream from the Hydroelectric Reach are typically 1 to 3 orders of magnitude lower relative to the reservoirs (Appendix C, Figure C-32; see also Raymond 2008, Kann et al. 2010a); however, the SWRCB/OEHHA Public Health Threshold (8 ug/L) and WHO guidelines for exposure to microcystin (i.e., < 4 µg/L) have been exceeded downstream from Iron Gate Dam on numerous occasions (Kann 2004, Kann and Corum 2009, Kann et al. 2010a, Fetcho 2010), including late-summer/early-fall *Microcystis aeruginosa* blooms in September 2007, 2009, and 2010 from Iron Gate Dam (RM 190.1) to the mouth of the Klamath River (RM 0.0). Overall, the 2005-2009 dataset indicates that while river exceedance do occur, they are far less in number than exceedance in Copco 1 and Iron Gate Reservoirs (Appendix C, Figure C-32; see also Raymond 2008, Kann et al. 2010a). Data from 2007 also indicate that microcystin can bioaccumulate in juvenile salmonids reared in Iron Gate hatchery (Kann 2008; see Section 3.3.3.3 Algal Toxins for a discussion of algal toxins as related to fish health)."	

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AO_LT_1230_071-110	Draft EIS/EIR Section 3.3.3.3.10 Algal Toxins has been modified to include additional available information regarding microcystin measurements in fish and mussel tissue samples from the Project reservoirs and the lower Klamath River. Additionally, the last sentence in the final paragraph of Draft EIS/EIR Section 3.4.3.4 (p.3.4-7) has been revised as follows: "High cell counts and toxin concentrations in the water column can result in bioaccumulation of microcystin in muscle and/or liver tissues of resident (i.e., yellow perch) and anadromous fish (i.e., juvenile hatchery Chinook, adult Chinook salmon, steelhead) and in freshwater mussels (Kann 2008, Kann and Corum 2009, Kann et al. 2011). Section 3.3.3.3.10 Algal Toxins presents a discussion of algal toxins in fish and mussel tissue."	Yes
AO_LT_1230_071-111	We disagree with the premise of the comment. It is not misleading to suggest that the Project reservoirs are the overwhelmingly predominant source of large blooms of *M aeruginosa* and very high concentrations of microcystin toxin to the Klamath River downstream from Iron Gate Dam. In fact it is misleading to suggest otherwise. The evidence is clear and unmistakable. We agree that Upper Klamath Lake does experience blooms of *M aeruginosa*, but those algal cells rarely survive to enter Copco 1 Reservoir, as shown repeatedly in the PacifiCorp and Karuk tribal reports on the topic (see for example Raymond 2008, 2009, 2010; and Kann and Corum, (2007), Kann and Corum (2009), Kann, 2006) and Asarian and Kann (2011)). Furthermore, we recognize that some *M aeruginosa* colonies persist in the lower river after they are exported from Iron Gate Reservoir, and in some cases they can accumulate in relatively large proportions along the margins of the river in quiescent locations. This does not mean that these accumulations are healthy, or that they would generate or could survive on their own without the continued source from the reservoirs. Open water samples taken in the lower Klamath River show cell counts and algal toxin concentrations that are an order of magnitude or more less than those in the reservoirs. In support of the above statements, the Draft EIS/EIR describes the presence of *Microcystis aeruginosa* in Upper Klamath Lake in Section 3.2.3.7, p.3.2-29. Similar text has been added to Section 3.4.3.3.1 to reiterate this fact: "*Microcystis aeruginosa* is believed to be responsible for the production of microcystin toxin in the lake, which has exceeded the WHO limit for drinking water (1 ug/L) and the Oregon Department of Public Health guidelines for issuing public health advisories (Section 3.2.3.7). Additional microcystin data collection in Upper Klamath Lake is ongoing (Vanderkooi et al. 2010, see Section 3.3, Aquatic Resources for more detail)."	Yes

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	In addition, an expanded discussion of phytoplankton data collected in 2005 and 2007-2010 has been added to Section 3.4.3.4 to clarify that Copco 1 and Iron Gate Reservoirs tend to have higher abundance of *Microcystis aeruginosa* than upstream river sites and that river sites downstream from the reservoirs tend to have higher abundance than the river sites upstream of the reservoirs. A figure modified from Kann and Asarian (2007) has also been included in Section 3.4.3.4 to illustrate the observed pattern. Lastly, the following text has been included in Final EIS/EIR Section 3.4.3.5.1 to clarify that the reservoirs export blue-green algal abundances which, under specific riverine conditions, can accumulate and cause a public health hazard: “Further downstream in the lower Klamath River, *Aphanizomenon flos-aquae* and *Microcystis aeruginosa* are generally documented at lower abundances (Kann and Asarian 2006, Raymond 2008), although in some years (e.g., 2007) abundance of *Microcystis aeruginosa* can be relatively greater at sites in the lower Klamath River than those immediately downstream from Iron Gate Dam (Raymond 2008). In general, turbulent mixing, increased velocity, and tributary dilution result in the gradual removal of suspended algal materials and chlorophyll-a from the water column as the river travels downstream (Armstrong and Ward 2008, Ward and Armstrong 2010) (see also discussion in Appendix C.2.2.1 and C.6.2.1). However, shorelines and protected coves and backwaters in the lower Klamath River can support summer and fall accumulations of blue-green algae including *Microcystis aeruginosa* (Kann and Corum 2006), and these accumulations can result in exceedance to the State Water Resource Control Board (SWRCB)/Office of Environmental Health and Hazard Assessment (OEHHA) Public Health Threshold (40,000 cells/mL) and WHO guidelines for *Microcystis aeruginosa* cell density (20,000 cells/mL). Despite this, data collected from 2005-2009 indicate that the majority of *Microcystis aeruginosa* cell density measurements at river sites in the lower Klamath River are less than the SWRCB/OEHHA Public Health Threshold of 40,000 cells/mL, while the vast majority of *Microcystis aeruginosa* cell densities in Copco 1 and Iron Gate Reservoir sites are greater than the SWRCB/OEHHA threshold (Appendix C, Figure C-30; see also Kann et al. 2010a). A similar pattern exists with respect to the lower WHO guidelines for *Microcystis aeruginosa* cell density (20,000 cells/mL) during 2005-2009 (i.e., the majority of river station measurements are less than the WHO guidelines, while the majority of reservoir station measurements are greater than the WHO guidelines). Since sampling of blue-green algae (and	

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	algal toxins) does not occur in the lower Klamath River until after large-scale summer and fall blooms in Copco 1 and Iron Gate Reservoirs have been observed, there is no documentation of the river occurrences of blue-green algae prior to the larger reservoir blooms." The text clarifications do not change the effect determinations of the Proposed Action and alternatives.	
AO_LT_1230_071-112	There is insufficient information provided in the comment to support the assertion of a consistent 4 to 6 week delay between high algal concentrations in the reservoirs and concentrations in downstream river reaches. It is difficult to conclusively demonstrate that river occurrences of blue-green algae only occur following large-scale reservoir blooms because sampling generally does not occur in the river until after reservoir blooms have been observed. However, the following text has been included in Final EIS/EIR Section 3.4.3.5.1 to clarify that specific riverine conditions can support accumulations of blue-green algae: "Further downstream in the lower Klamath River, *Aphanizomenon flos-aquae* and *Microcystis aeruginosa* are generally documented at lower abundances (Kann and Asarian 2006, Raymond 2008), although in some years (e.g., 2007) abundance of *Microcystis aeruginosa* can be relatively greater at sites in the lower Klamath River than those immediately downstream from Iron Gate Dam (Raymond 2008). In general, turbulent mixing, increased velocity, and tributary dilution result in the gradual removal of suspended algal materials and chlorophyll-a from the water column as the river travels downstream (Armstrong and Ward 2008, Ward and Armstrong 2010) (see also discussion in Appendix C.2.2.1 and C.6.2.1). However, shorelines and protected coves and backwaters in the lower Klamath River can support summer and fall accumulations of blue-green algae including *Microcystis aeruginosa* (Kann and Corum 2006), and these accumulations can result in exceedance to the SWRCB/OEHHA Public Health Threshold (40,000 cells/mL) and WHO guidelines for *Microcystis aeruginosa* cell density (20,000 cells/mL). Despite this, data collected from 2005-2009 indicate that the majority of *Microcystis aeruginosa* cell density measurements at river sites in the lower Klamath River are less than the California SWRCB/OEHHA Public Health Threshold of 40,000 cells/mL, while the vast majority of *Microcystis aeruginosa* cell densities in Copco 1 and Iron Gate Reservoir sites are greater than the SWRCB/OEHHA threshold (Appendix C, Figure C-30; see also Kann et al. 2010a). A similar pattern exists with respect to the lower WHO guidelines for *Microcystis aeruginosa* cell density	Yes

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	(20,000 cells/mL) during 2005-2009 (i.e., the majority of river station measurements are less than the WHO guidelines, while the majority of reservoir station measurements are greater than the WHO guidelines). Since sampling of blue-green algae (and algal toxins) does not occur in the lower Klamath River until after large-scale summer and fall blooms in Copco 1 and Iron Gate Reservoirs have been observed, there is no documentation of the river occurrences of blue-green algae prior to the larger reservoir blooms. ”	
AO_LT_1230_071-113	The comment is focused on sites in the lower river (i.e., Brown Bear) and immediately downstream from Iron Gate Dam, while the referenced paragraph in the Draft EIS/EIR is focused on the Klamath Estuary. These are not the same locations. Additionally, the referenced paragraph states the following: “Phytoplankton densities are generally lower in [the Klamath Estuary] than those measured concurrently in the lower Klamath River.” The term “generally” means that there can be instances where densities could be greater. While additional data is posted on the Klamath Basin Monitoring Program Web site, it doesn’t change the finding reported in Section 3.4.3.6. No change is required in the Draft EIS/EIR Section 3.4.3.6. However, to address the issue that *Microcystis aeruginosa* cell counts and microcystin toxin concentrations at sites in the lower Klamath River (such as Brown Bear) can be very high (i.e., greater than levels at the site immediately downstream from Iron Gate Dam), text in Section 3.4.3.5.1 has been changed to read as follows: “Further downstream in the lower Klamath River, *Aphanizomenon flos-aquae* and *Microcystis aeruginosa* are generally documented at lower abundances (Kann and Asarian 2006, Raymond 2008), although in some years (e.g., 2007) abundance of *Microcystis aeruginosa* can be relatively greater at sites in the lower Klamath River than those immediately downstream from Iron Gate Dam (Kann and Corum 2009, Raymond 2008, YTEP 2008). In general, turbulent mixing, increased velocity, and tributary dilution result in the gradual removal of suspended algal materials and chlorophyll-a from the water column as the river travels downstream (Armstrong and Ward 2008, Ward and Armstrong 2010) (see also discussion in Appendix C.2.2.1 and C.6.2.1). However, shorelines and protected coves and backwaters in the lower Klamath River can support summer and fall accumulations of blue-green algae including *Microcystis aeruginosa* (Kann and Corum 2006), and these accumulations can result in exceedance to the SWRCB/OEHHA Public Health Threshold (40,000 cells/mL) and WHO guidelines for *Microcystis aeruginosa* cell density (20,000 cells/mL).”	Yes

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	Finally, although there are instances when surface grab samples taken for public health purposes have algal counts or algal toxin concentrations that are higher than those measured immediately downstream from Iron Gate Dam, such comparisons must be made with care. The public health sampling occurs in locations that are not representative of downstream transport and represent the most favorable habitat available in the lower river for phytoplankton accumulations. These accumulations could have been building for weeks, based on previous releases from Iron Gate Reservoir. Their existence does not absolve the reservoirs from the role of providing the inoculum for growth. To date, there have been no studies that conclusively demonstrate that *Microcystis aeruginosa* is generated in situ in the lower Klamath River without a significant contributing role from the reservoirs as either the sole source, initiating, or perpetuating the occurrence of this blue-green algae species. There is a substantial body of evidence that indicates that the reservoirs release cyanobacteria and associated toxins downstream. And in no case are the concentrations observed in the Klamath Estuary (as specified by the comment location) significantly higher than those observed at Brown Bear or just downstream from Iron Gate Dam, particularly when accounting for transport time from upstream."	
AO_LT_1230_071-114	The portion of the sentence "suggesting that *Microcystis aeruginosa* is transported from the Klamath Hydroelectric Project reservoirs into the lower river and subsequently into the estuary" has been deleted. Additionally, the following text has been included in Final EIS/EIR Section 3.4.3.5.1 to clarify that specific riverine conditions can support accumulations of blue-green algae: "Further downstream in the lower Klamath River, *Aphanizomenon flos-aquae* and *Microcystis aeruginosa* are generally documented at lower abundances (Kann and Asarian 2006, Raymond 2008), although in some years (e.g., 2007) abundance of *Microcystis aeruginosa* can be relatively greater at sites in the lower Klamath River than those immediately downstream from Iron Gate Dam (Raymond 2008). In general, turbulent mixing, increased velocity, and tributary dilution result in the gradual removal of suspended algal materials and chlorophyll-a from the water column as the river travels downstream (Armstrong and Ward 2008, Ward and Armstrong 2010) (see also discussion in Appendix C.2.2.1 and C.6.2.1). However, shorelines and protected coves and backwaters in the lower Klamath River can support summer and fall accumulations of blue-green algae including *Microcystis aeruginosa* (Kann and Corum 2006), and these accumulations can result in exceedance to the SWRCB/OEHHA Public Health	Yes

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	Threshold (40,000 cells/mL) and WHO guidelines for *Microcystis aeruginosa* cell density (20,000 cells/mL). Despite this, data collected from 2005-2009 indicate that the majority of *Microcystis aeruginosa* cell density measurements at river sites in the lower Klamath River are less than the SWRCB/OEHHA Public Health Threshold of 40,000 cells/mL, while the vast majority of *Microcystis aeruginosa* cell densities in Copco 1 and Iron Gate Reservoir sites are greater than the SWRCB/OEHHA threshold (Appendix C, Figure C-30; see also Kann et al. 2010a). A similar pattern exists with respect to the lower WHO guidelines for *Microcystis aeruginosa* cell density (20,000 cells/mL) during 2005-2009 (i.e., the majority of river station measurements are less than the WHO guidelines, while the majority of reservoir station measurements are greater than the WHO guidelines). Since sampling of blue-green algae (and algal toxins) does not occur in the lower Klamath River until after large-scale summer and fall blooms in Copco 1 and Iron Gate Reservoirs have been observed, there is no documentation of the river occurrences of blue-green algae prior to the larger reservoir blooms." Lastly, the text in Draft EIS/EIR Section 3.4.4.1 has been clarified to read as follows: "Existing information regarding blue-green algal blooms in the Klamath Basin suggests that several critical factors affect the frequency and toxicity of such blooms in Upper Klamath Lake and the Klamath Hydroelectric Project reservoirs: water temperature, light levels (FERC 2007), flow rates (Kann 2006), nutrient availability/ratios (Chorus and Bartram 1999, Fetcho 2008, Moisander and Lincoff 2009) and wind-induced turbulence and mixing. In this nutrient-rich system, elevated temperatures and increased light levels that occur during the summer and early fall result in seasonal blue-green algal blooms in Upper Klamath Lake and the Klamath River, and especially the reservoir reaches. In addition to Upper Klamath Lake and Copco 1 and Iron Gate Reservoirs, riverine reaches in close proximity to the reservoirs generally experience high abundance of *Microcystis aeruginosa* (Kann 2006, Kann and Corum 2009), with the highest cell densities and microcystin toxin concentrations occurring within and directly below the reservoirs (Kann and Corum 2009). This information indicates that the reservoirs provide ideal conditions (see Section 3.4.3.1) for proliferation of blue-green algal species, and likely also serve as a source of algal cells and their toxins to downstream areas. While blue-green algae can occur in riverine and estuarine environments (Christian et al. 1986, Baxter et al. 2010), Huisman et al. (2004) demonstrate that the rate of turbulent mixing in the	

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	water column relative to algal flotation velocity is a critical factor controlling the size of blue-green algal blooms." The text clarifications do not change the effect determinations of the Proposed Action and alternatives.	
AO_LT_1230_071-115	The text in Draft EIS/EIR Section 3.4.4.1 has been clarified to read as follows: "Existing information regarding blue-green algal blooms in the Klamath Basin suggests that several critical factors affect the frequency and toxicity of such blooms in Upper Klamath Lake and the Klamath Hydroelectric Project reservoirs: water temperature, light levels (FERC 2007), flow rates (Kann 2006), nutrient availability/ratios (Chorus and Bartram 1999, Fetcho 2008, Moisander and Lincoff 2009) and wind-induced turbulence and mixing. In this nutrient-rich system, elevated temperatures and increased light levels that occur during the summer and early fall result in seasonal blue-green algal blooms in Upper Klamath Lake and the Klamath River, and especially the reservoir reaches. In addition to Upper Klamath Lake and Copco 1 and Iron Gate Reservoirs, riverine reaches in close proximity to the reservoirs generally experience high abundance of *Microcystis aeruginosa* (Kann 2006, Kann and Corum 2009), with the highest cell densities and microcystin toxin concentrations occurring within and directly below the reservoirs (Kann and Corum 2009). This information indicates that the reservoirs provide ideal conditions (see Section 3.4.3.1) for proliferation of blue-green algal species, and likely also serve as a source of algal cells and their toxins to downstream areas. While blue-green algae can occur in riverine and estuarine environments (Christian et al. 1986, Baxter et al. 2010), Huisman et al. (2004) demonstrate that the rate of turbulent mixing in the water column relative to algal flotation velocity is a critical factor controlling the size of blue-green algal blooms." Additionally, the text in Draft EIS/EIR Section 3.4.3.1 has been clarified to read as follows: "The stable lacustrine environment created at the Four Facilities, particularly in the larger Copco 1 and Iron Gate Reservoirs, coupled with high nutrient availability and high water temperatures in summer to fall, provides ideal conditions for phytoplankton growth, including the growth of blue-green algal species. While blue-green algae can be found in a variety of lake, reservoir, river, and estuarine environments, in particular, these species thrive under warm water temperature, high nutrient, and stable water column conditions (Konopka and Brock 1978, Kann 2006), where they can out-compete other algal species such as diatoms. Huisman et al. (2004) demonstrate that *Microcystis aeruginosa* can dominate the phytoplankton	Yes

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	assemblage at low turbulent diffusivity (i.e., calm-stable lacustrine conditions) when their flotation velocity exceeds the rate of turbulent mixing." The text clarifications do not change the effect determinations of the Proposed Action and alternatives.	
AO_LT_1230_071-116	Draft EIS/EIR Section 3.3.3.3. Disease and Parasites (p.3.3-37) provides the requested information, as follows: "The polychaete host for the parasite is present in a variety of habitat types, including runs, pools, riffles, edge-water, and reservoir inflow zones, as well as sand, gravel, boulders, bedrock, aquatic vegetation, and is frequently present with a periphyton species: Cladophora (Bartholomew and Foott 2010). Slow-flowing and more stable habitats (e.g., pools with sand) may support higher densities of polychaetes, (Bartholomew and Foott 2010), especially if in stream flows remain constant." The referenced statement in Draft EIS/EIR Section 3.4.4.3 is not incorrect – Cladophora do provide suitable habitat for the polychaete host for the parasite – and the comment does not state why the additional information is important to the analysis of fish disease conditions under the No Action/No Project Alternative. No change is required in the Draft EIS/EIR.	No
AO_LT_1230_071-117	Master Response WQ-16 Upper Klamath Basin Historically Productive but Land Use Exacerbates Problem. Although the agencies readily acknowledge that there are abundant natural sources of phosphorus in the basin, we disagree with the assertion that no significant water quality improvements can be expected in either Upper Klamath Lake or the Upper Klamath River System. Uncertainty is inherent to any analysis of future conditions, particularly in a system as complex as the Klamath Basin. The degree of uncertainty should always be considered as part of the decision-making process. The TMDLs themselves consider uncertainty when estimating the assimilative capacity of a water body and setting limits on the amount of pollution that can be added and still meet water quality standards; CWA section 303(d) requires that TMDLs are established with a margin of safety to account for uncertainty. The Draft EIS/EIR has been prepared according to requirements of NEPA and CEQA. Accordingly, assessments of the effects of the Proposed Action and alternatives on future water quality and algae conditions in the Klamath River involve comparison to both existing conditions (CEQA) and future conditions (NEPA). Future conditions include "reasonably foreseeable actions" that are independent of FERC	Yes

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	licensing and are expected to occur during the 50-yr period of analysis (2012 to 2061). With respect to water quality in the Klamath Basin, reasonably foreseeable actions include implementation of TMDLs for Oregon and California (see full list of reasonably foreseeable actions associated with water quality in Section 3.2.4.1, p.3.2-25). Uncertainty is inherently associated with each of the reasonably foreseeable actions, including TMDL implementation, and does not eliminate the requirement to include these actions in the analyses. The same is true for KBRA implementation, which, as a connected action, is analyzed at a program-level. Uncertainty regarding TMDL and KBRA implementation is appropriately called out in statements throughout the Draft EIS/EIR (such as the ones cited in the comment). Effects determination statements for the No Action/No Project Alternative in Section 3.2 Water Quality and Section 3.4 Algae include an explicit acknowledgement that full attainment of the Oregon and California TMDLs would improve water quality but the implementation mechanisms and timing are unknown. The general assertion of uncertainty associated with respect to TMDL implementation made by the comment does not provide finer resolution than the statements already made in the Draft EIS/EIR. *Colman et al. (2004) was not cited in the Draft EIS/EIR and has been added to the Final EIS/EIR.	
AO_LT_1230_071-118	We disagree with the comment. Large blooms of *Microcystis aeruginosa* would not be likely to occur in these areas under the Proposed Action because there would be no inoculum from the upstream reservoirs (i.e., Copco 1 and Iron Gate Reservoirs). It has not been demonstrated that the reservoirs are not the initial cause or source of the high algal counts or toxin concentrations that occur at downstream river sites, or that these situations can occur in the absence of an upstream source. Additionally, the bolded significance statement in the Draft EIS/EIR states “reduce or eliminate”, rather than just “eliminate”. Thus, the possibility for relatively smaller occurrences of nuisance and/or noxious phytoplankton in the river under the Proposed Action is already included. Nonetheless, the text in Section 3.4.4.3 has been clarified to read as follows: “Existing data indicate that large seasonal blue-green algae blooms (i.e., *Microcystis aeruginosa*) and associated algal toxins (i.e., microcystin) in Copco 1 and Iron Gate Reservoirs and the Klamath River downstream from Iron Gate Dam are not the result of algal transport from Upper Klamath Lake; rather, these blooms occur in the two largest Project reservoirs and are transported to Klamath River sites downstream from Iron Gate	Yes

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	Dam (see Figure 3.4-1). The following physical mechanisms are responsible for the removal of large seasonal blue-green algal blooms that originate in Upper Klamath Lake and are transported into the upper reaches of the Klamath River: 1. Large-scale settling in the Keno Impoundment (see Section 3.2.3.3 and Appendix C, Section C.2.1.3); 2. Turbulent mixing and associated algal cell breakdown in the river from Keno Dam to J.C. Boyle Reservoir (see Section 3.2.3.3 and Appendix C, C.2.1.3); and, 3. Dilution from springs in the J.C. Boyle bypass reach (see Section 3.2.3.3 and Appendix C, C.2.1.4). Further, under current conditions, microcystin toxin rarely persists through steps 1 to 3, occurring at low (very infrequently) to non-detectable (primarily) concentrations at the Klamath River station just upstream of Copco 1 Reservoir ("KRAC") (see also Figure 3.4-1). The aforementioned removal mechanisms for algal cells (and microcystin) would still occur under the Proposed Action, and additional removal could occur in the Hydroelectric Reach due to turbulence and relatively high velocities in the free-flowing river reaches that were previously occupied by Copco 1 and Iron Gate Reservoirs. The primary lacustrine habitat for supporting seasonal nuisance and/or noxious phytoplankton blooms in the Hydroelectric Reach would be eliminated and there is little reason to suspect that large blooms of *Microcystis aeruginosa* from Upper Klamath Lake would be successfully transported into the Klamath River downstream from Iron Gate Dam. Therefore, the overall occurrence of nuisance and/or noxious phytoplankton and associated toxins in the Klamath River downstream from Iron Gate Dam would be substantially reduced or eliminated. Increases in nutrient availability associated with delivery and deposition of sediments from the upper watershed could occur over the long term as a result of dam removal (Reclamation 2012d; Section 3.3.4.3). However, possible summer through fall increases in nutrient concentrations, particularly directly downstream from Iron Gate Dam, following dam removal (see Section 3.2.4.3.2.3 Nutrients – Lower Klamath Basin) would not substantially contribute to blue-green algal blooms downstream from the dam due to the lack of the suitable hydrodynamic conditions required for extensive planktonic algal growth in the Klamath River. While some phytoplankton growth could occur along shorelines and protected coves and backwaters in the Lower Klamath River during low-flow periods, *Microcystis aeruginosa* cell density and microcystin concentrations are not	

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	expected to exceed current levels, which are typically 1 to 3 orders of magnitude lower relative to those measured in Copco 1 and Iron Gate Reservoirs (Appendix C, Figure C-32; see also Kann et al. 2010)." The text clarifications do not change the effect determinations of the Proposed Action and alternatives.	
AO_LT_1230_071-119	Text in Section 3.4.4.3 has been clarified to read as follows: "Existing data indicate that large seasonal blue-green algae blooms (i.e., *Microcystis aeruginosa*) and associated algal toxins (i.e., microcystin) in Copco 1 and Iron Gate Reservoirs and the Klamath River downstream from Iron Gate Dam are not the result of algal transport from Upper Klamath Lake; rather, these blooms occur in the two largest Project reservoirs and are transported to Klamath River sites downstream from Iron Gate Dam (see Figure 3.4-1). The following physical mechanisms are responsible for the removal of large seasonal blue-green algal blooms that originate in Upper Klamath Lake and are transported into the upper reaches of the Klamath River: 1. Large-scale settling in the Keno Impoundment (see Section 3.2.3.3 and Appendix C, Section C.2.1.3); 2. Turbulent mixing and associated algal cell breakdown in the river from Keno Dam to J.C. Boyle Reservoir (see Section 3.2.3.3 and Appendix C, C.2.1.3); and, 3. Dilution from springs in the J.C. Boyle bypass reach (see Section 3.2.3.3 and Appendix C, C.2.1.4). Further, under current conditions, microcystin toxin rarely persists through steps 1 to 3, occurring at low (very infrequently) to non-detectable (primarily) concentrations at the Klamath River station just upstream of Copco 1 Reservoir ("KRAC") (see also Figure 3.4-1). The aforementioned removal mechanisms for algal cells (and microcystin) would still occur under the Proposed Action, and additional removal could occur in the Hydroelectric Reach due to turbulence and relatively high velocities in the free-flowing river reaches that were previously occupied by Copco 1 and Iron Gate Reservoirs. The primary lacustrine habitat for supporting seasonal nuisance and/or noxious phytoplankton blooms in the Hydroelectric Reach would be eliminated and there is little reason to suspect that large blooms of *Microcystis aeruginosa* from Upper Klamath Lake would be successfully transported into the Klamath River downstream from Iron Gate Dam. Therefore, the overall occurrence of nuisance and/or noxious phytoplankton and	Yes

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	associated toxins in the Klamath River downstream from Iron Gate Dam would be substantially reduced or eliminated." The text clarifications do not change the effect determinations of the Proposed Action and alternatives.	
AO_LT_1230_071-120	Increased scouring in the Klamath River under the Proposed Action would occur primarily due to greater movement of gravel, cobble, and coarse sediment downstream from the Project dams, rather than as a result of a "dramatically [altered] flow regime" as suggested by the comment. The areas downstream from the dams have been starved of sediment since the construction of the dams. The lack of sediment causes the bed material downstream from the dams to be less mobile than it would be under natural conditions. The immobile nature of the sediment is detrimental to habitat downstream from the dam and re-supply of sediment would improve the aquatic habitat downstream from the dam over the long term. Draft EIS/EIR Section 3.3.4.3 discusses the anticipated changes in the streambed downstream from Iron Gate Dam due to sediments released from behind the dams and reconnection of the natural sediment supply from upstream under the Proposed Action. Additionally, a detailed assessment of the current sediment conditions downstream from Iron Gate Dam is found in: Reclamation (2012d). "Hydrology, Hydraulics and Sediment Transport Studies for the Secretary's Determination on Klamath River Dam Removal and Basin Restoration," Technical Report No. SRH-2011-02. Prepared for Mid-Pacific Region, Bureau of Reclamation, Technical Service Center, Denver, CO. It is available at: http://klamathrestoration.gov/keep-me-informed/secretarial-determination/role-of-science/secretarial-determination-studies. Lastly, the reference to Section 3.3.4.3 on p.3.4-17 has been clarified as "Section 3.3.4.3 Proposed Action – Bedload Sediment" in the Final EIS/EIR.	Yes
AO_LT_1230_071-121	We disagree with the comment that "It is unsubstantiated that cyanobacteria (and associated toxins) in the Project reach affect cyanobacteria (and associated toxins) in the Klamath Estuary, some 190 miles downriver". There is ample evidence that the river downstream from the Project reservoirs is negatively affected by cyanobacteria and toxins that are exported from the reservoirs. Even if some locations in the Lower Klamath River accumulate cyanobacterial growth that is capable of sustaining itself, it is highly unlikely that these growths would be able to generate without the upstream source from the reservoirs. It has not been demonstrated that these isolated pockets of *Microcystis aeruginosa* are capable of being initiated, nor sustaining	Yes

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	continued growth in the river in the absence of the reservoirs. Further, the effect determination in Draft EIS/EIR Section 3.4.4.3 states "reduce or eliminate", rather than just "eliminate". Thus, the possibility for relatively smaller occurrences of nuisance and/or noxious phytoplankton in the Klamath Estuary under the Proposed Action is already included in the Draft EIS/EIR. To further clarify, the following text has been included in Final EIS/EIR Section 3.4.4.3.2 – Klamath Estuary. "Existing information indicates that instances of elevated levels of *Microcystis aeruginosa* in the Klamath Estuary correspond with elevated levels measured at upstream locations in the lower Klamath River (Section 3.4.3.6). Since removal of the Four Facilities would reduce or eliminate elevated *Microcystis aeruginosa* levels in the lower Klamath River (see prior section), levels in the Klamath Estuary are also likely to be reduced or eliminated." "As discussed for the Klamath River downstream from Iron Gate Dam, increases in nutrient transport from the upper watershed could occur over the long term as a result of dam removal (CDM 2011b; Section 3.3.4.3). However, possible summer through fall increases in nutrient concentrations, particularly directly downstream from Iron Gate Dam, following dam removal (see Section 3.2.4.3.2.3 Nutrients – Lower Klamath Basin) would not contribute significantly to blue-green algal blooms downstream from the dam due to the lack of the suitable hydrodynamic conditions required for extensive planktonic algal growth following implementation of the Proposed Action. Thus, while some phytoplankton growth could occur in estuarine backwaters, *Microcystis aeruginosa* cell density and microcystin concentrations would not be expected to exceed current levels, which are typically 1 to 3 orders of magnitude lower relative to those measured in Copco 1 and Iron Gate Reservoirs (Appendix C, Figure C-32; see also Kann et al. 2010a)." The text clarifications do not change the effect determinations of the Proposed Action and alternatives.	
AO_LT_1230_071-122	The portion of the sentence of concern in the comment ("in the area of analysis") has been deleted because it is too broad and not necessary (since the table section header already denotes what reach is being considered).	Yes
AO_LT_1230_071-123	Discussion has been revised to state that the current low-flow situation and the lack of natural flow variability and scouring from intermittent high flows likely contribute to the prevalence of reed canarygrass in this area.	Yes

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AO_LT_1230_071-124	Text was revised to clarify that neither tailed frog or southern torrent salamander would be expected to occur in the mainstem of the Lower Klamath River.	Yes
AO_LT_1230_071-125	Master Response TERR-3 Invasive Species Control.	No
AO_LT_1230_071-126	Section 3.6 is focused on the changes to flood hydrology, as indicated in the section introduction. Changes to river geomorphology are assessed in Section 3.11.	No
AO_LT_1230_071-127	CEQA regulations Section 15064.7(a) indicates that “A threshold of significance is an identifiable quantitative, qualitative or performance level of a particular environmental effect.” The Lead Agencies have selected qualitative thresholds, which is consistent with CEQA. The thresholds of significance in Section 3.6 are based on CEQA Guidelines, Appendix G. The Code of Federal Regulations (CFR) also does not require quantitative significance criteria relative to NEPA.	No
AO_LT_1230_071-128	The references used in the analysis are specific to the Pacific Northwest and the Klamath Basin, which includes the portions of Northern California and Southern Oregon included in the study area for the Proposed Action and alternatives. The Lead Agencies considered the eight additional references cited by the comment author. However, the current analysis is not proposed to be updated with the eight references because they predominantly discuss impacts in the Sierra Nevada mountain range, which are not a part of the Klamath Basin.	No
AO_LT_1230_071-129	Text in the Final EIS/EIR was revised to state “[h]igh water temperatures have also been associated with fish die offs in the Lower Klamath River downstream from Iron Gate Dam.”	Yes
AO_LT_1230_071-130	The text in the Final EIS/EIR was revised to state the following: “The Klamath Hydroelectric Project reservoirs have characteristics that would favor high (at least one percent of the amount of Greenhouse Gases (GHG) emissions that could occur from removing the hydroelectric facilities) methane (CH4) emissions…”	Yes
AO_LT_1230_071-131	The report titled "A Preliminary Evaluation of the Potential Downstream Sediment Deposition Following the Removal of Iron Gate, Copco, and J.C. Boyle Dams, Klamath River, California" (Stillwater Sciences 2002) was used as the basis for this statement. The Stillwater report uses a relationship between shear velocity and settling velocity to estimate that 0.68 mm is the particle size where particles are suspended/settled at 3,000 cubic	No

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	feet per second (cfs). The relationship used in the Stillwater report was presented in the Journal of Hydraulic Engineering (van Rijn 1984).	
AO_LT_1230_071-132	Descriptions of tribal history, cultural practices, religious practices, oral traditions and health impacts are general and reflect Tribal perspectives on resource issues. Quantifiable data on Project effects to water, aquatic, and terrestrial resources are found in Sections 3.2, 3.3, 3.4, and 3.5. To clarify the process used to develop the Current Effects Background Technical Report and Potential Effects Background Technical Report language has been added to Section 3.12, as well as, Table 3.12-1 through Table 3.12-6. As part of the study for the Current Effects Background Technical Report, government-to-government consultations were conducted with the six basin tribes to solicit input from the tribal governments regarding their assessment of effects on Indian trust resources, tribal rights to take those resources, other resources traditionally used by tribes, and cultural values related to those resources and rights within the study area resulting from the current operations of the four PacifiCorp dams on the Klamath River. The reader should note that inclusion of any claims and assertions put forth by these tribes does not necessarily imply that the U.S. Government endorses those views. Three rounds of consultation meetings were held between the Cultural/Tribal Sub-team and each of the six tribal governments The purpose of the first consultation meetings (Round 1) was to describe the process of the Current Effects Background Technical Report, elicit information about the histories and backgrounds of the tribes, and discuss how the dams might be currently affecting their resources and rights and related cultural values. In response, the Yurok, Resighini, Karuk, and Klamath Tribes, DOI provided comprehensive background documents. The Round 2 meetings were conducted to collect comments from the tribes concerning the Current Effects Background Technical Report and the potential effects of the Dams In Scenario and the Dams Out Scenario on their trust and other resources and rights. In Round 3, DOI sought comments from the tribes on the first draft of the Potential Effects Background Technical Report.	Yes
AO_LT_1230_071-133	The analysis in Section 3.12 qualitatively identifies the effects of each alternative. Many of these effects are beneficial. Under 40 CFR 1500.1 c. 'The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences'. Quantifying the degree that an	No

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	action benefits the environment may be interesting, however is not essential for a reasoned choice between alternatives if that choice is based on the degree and significance of environmental consequences. Indeed 40 CFR 1500.1 b, states 'NEPA documents must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail.'	
AO_LT_1230_071-134	The purpose of bringing non-project related effects into the discussion of tribal trust is to provide a broader context concerning the shift to an industrial economy, of which the Klamath Hydroelectric Project is a significant component within the Klamath Basin. Section 3.12 broadly describes the effects of PacifiCorp dams from a tribal perspective based on quantifiable data on Project effects to water quality, aquatic resources, algae, and terrestrial resources. The analyses of these types of resources are found in EIS/EIR Sections 3.2, 3.3, 3.4, and 3.5. Copco 1 Dam, completed in 1918, was the first mainstem dam to block fish passage to the majority of the Upper Klamath Basin. Iron Gate Dam, completed in 1962, is the downstream-most dam that blocks upstream fish passage. Flow releases from Iron Gate Dam, and the quality of the water being released, affect the quantity and quality of fish habitat for listed and non-listed species in the mainstem downstream from Iron Gate Dam (FERC 2007). The other hydroelectric dams, with the exception of J.C. Boyle Dam, which is equipped with a ladder that does not meet current standards (Administrative Law Judge 2006), also block upstream fish passage and isolate fish populations between these dams. The dams have eliminated access for anadromous fish, including salmon and steelhead, to approximately 420 miles of potential habitat upstream of Iron Gate Dam. While removal of PacifiCorp dams would not fully address or mitigate impacts to tribes caused by a reduction in the Klamath River fishery, as described in Section 3.3, there would likely be an increase in fish and other aquatic species after dam removal.	No
AO_LT_1230_071-135	The language in Draft EIS/EIR Section 3.12.3.13.12 third paragraph has been clarified to describe the analysis used to evaluate the condition of the assets held in trust for The Klamath Tribes.	Yes
AO_LT_1230_071-136	Executive Order 13007 and Native American Grave Protection and Repatriation Act (NAGPRA) apply to sites on Federal lands or federally recognized Indian lands, identified by federally recognized tribes. State laws will apply to burial sites on non-Federal lands. Ceremonial sites and burial grounds are	No

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	considered as potential historic properties under the NHPA in Section 3.13, Cultural and Historic Resources of the Draft EIS/EIR. Additional consultations to identify sites of religious and cultural values are addressed in Mitigation Measures CHR-2, CHR-3, and CHR-4.	
AO_LT_1230_071-137	The U.S. Government does not believe that any trust resources of the Karuk tribe are affected by current operations or would be affected by the Proposed Action. Table 3.12-2 lists traditionally used resources of the Karuk Tribe. Section 3.12 has been updated to clarify this information.	Yes
AO_LT_1230_071-138	A clarifying footnote has been added to Section 3.12 to describe how the information provided by the Hoopa Valley Tribe was a personal account of the history of the Klamath River. The footnote then goes on to describe the Fall Creek Hatchery history and its purpose.	Yes
AO_LT_1230_071-139	The Draft EIS/EIR Section 3.13, Cultural and Historic Resources, p. 3.13-1, has been edited to include the Archaeological Resources Protection Act (ARPA) as part of the regulatory framework. A description of Executive Order 13007 Sacred Sites has also been added to Section 3.13, Cultural and Historic Resources.	Yes
AO_LT_1230_071-140	As stated in EIS/EIR Section 3.13, Cultural and Historic Resources, discussions for each alternative, the finding of effect under the NHPA Section 106 for Alternatives 2, 3, 4, and 5 is an adverse effect. Under the No Action Alternative 1, ongoing effects are acknowledged but no finding of effect is made since this alternative is not part of the current undertaking. Pursuant to CEQA the section did note however, that with mitigation the effect could be reduced to a less than significant level.	No
AO_LT_1230_071-141	The KHSA maps have been used to update the figures in the Final EIS/EIR.	Yes
AO_LT_1230_071-142	Output is measured as the dollar value of industry production. Output can also be thought of as sales. Tables that present regional economic summaries and effects include footnotes that define each economic measurement.	No
AO_LT_1230_071-143	Curry county is considered local for estimating Klamath Management Zone (KMZ)-OR impacts. Del Norte and Humboldt counties are considered local for estimating KMZ-CA impacts.	No

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AO_LT_1230_071-144	Real estate values are discussed on pp. 3.15-20 and 3.15-63. It is clear that dam removal would affect property values over the long term. However, the net magnitude of these changes is difficult to forecast. In the long term, land values of parcels downstream from Iron Gate Dam with river views could increase because of restoration of the river, including improved water quality and more robust anadromous fish runs. Land that currently has reservoir views could decline in value. However, any declines could be at least partially offset by improvements in water quality. It is difficult to evaluate the magnitude of the net changes under the Proposed Action in the long term. Quantifying any changes in real estate values is challenging for a variety of reasons. The Draft EIS/EIR, on p. 3.15-36 discusses this issue: "Dam removal could also potentially increase the value of property near and adjacent to the Klamath River downstream from Iron Gate Dam due to improved water quality and more robust runs of anadromous fish. The net value of the changes, and the time over which such changes might be observed in market prices, is uncertain. In concept, to evaluate impacts on real estate values, one would collect market sales data for different properties with different characteristics, which would include “view amenities.” This data would include market values for land that had reservoir views, river view, and no views. All else equal, the difference in the land values for properties with different amenities would represent the impacts on real estate values. This is a challenging exercise in thin markets, where the long-term value changes are not known, and where other exogenous factors affecting real estate markets may overwhelm the effects of dam removal." A hedonic analysis was not feasible due to the lack of detailed sales data. However, a number of studies have examined property value issues associated with dam removal. It is important to recognize that background conditions and trends in the property market study area do impact values outside of dam removal. Forecasts and studies of changes in property values cannot be examined in a vacuum, but must incorporate previous and ongoing market trends. Additionally, analysis of impacts to private property values following dam removal can vary greatly depending on the geographical location of the dams/private property and the size of the impoundment. In addition, a number of other factors may impact property values in the impacted region after dam removal including: • Future ownership of reclaimed land following dam removal;	No

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	• Future access to the river compared to lake access with the dams • Improved water quality following dam removal; • Restoration of formerly submerged land following dam removal; • Potential impacts on the water table and corresponding effects on nearby wells; and • Potential impacts on recreation resources including fishing, canoeing and kayaking. A number of studies have examined property value issues (.e.g., Provencher, B., Sarakinos, H., and Meyer, T., 2006. Does Small Dam Removal Affect Local Property Values? An Empirical Analysis. Agricultural and Applied Economics, Staff Paper Series No. 501. July, 2006). The majority of the studies of dam removal are focused on small dams. Of the 500 dams removed in the last 100 years in the United States, the great majority have been small dams. A small dam is defined as a dam for which the removal decision and undertaking can be entirely handled by local entities. In some of the case studies it was feared that the value of adjacent properties would decline with the loss of the dam and loss of its associated impoundment. However, residential properties located in the vicinity of a free-flowing stream or river may be more valuable than identical properties in the vicinity of a small impoundment. Property values may decrease or remain static in the short term and may increase in the long term, as the stream and associated riparian zone matures to a “natural” free-flowing state, or is managed as a desirable open space. In terms of the direct impacts to private property values, some studies reported increases in value following dam removal (i.e., Bohlen, Curtis and Lynne Y. Lewis. 2008. Examining the Economic Impacts of Hydropower Dams on Property Values using GIS. Journal of Environmental Management. July 2008; Born, Stephen M., Kenneth D. Genskow, Timothy L. Filbert, Nuria Hernandez-More, Mathew L. Keefer, Kimberly A. White. 1998. Socioeconomic and Institutional Dimensions of Dam Removals, The Wisconsin Experience. Environmental Management 22(3): 359-370). Increases in value were generally related to improvements in water quality, removal of dam structures, and enhancement of the natural riparian environment. Other studies described private property values decreasing briefly and regaining value by the end	

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	of two years (Kruse, S.A. and Astrid J. Scholz. 2006. Preliminary Economic Assessment of Dam Removal: The Klamath River. Published by Ecotrust). The extent to which these other studies are relevant for Klamath is limited due to differing conditions. The Landsford study employed a hedonic price approach to examine components of the recreational and aesthetic value of a lake in the central Texas chain called the "Highland Lakes." The study addressed the implicit recreational and aesthetic price placed on Lake Austin by homeowners living near it. The study was based on data from 609 sales. The dataset included detailed information on each sale. Similar data was not readily available for Klamath property sales.	
AO_LT_1230_071-145	The economic analysis shows the total effects of the KBRA program, which would be implemented over a 15-year period. The impacts would vary year by year during 2012–2026 proportionate to actual in-region expenditures.	No
AO_LT_1230_071-146	The table shows total jobs expected over a 15 year period, not annual jobs. A footnote will be added to the table that defines the use of jobs. This table is consistent with the use of the term "jobs" throughout Section 3.15.	No
AO_LT_1230_071-147	Tables 3.15-65 and 3.15-66 summarize positive and negative impacts of the Proposed Action. Table 3.15-67 has been removed from the EIS/EIR.	Yes
AO_LT_1230_071-148	Section 3.16, Environmental Justice, provides data (Table 3.16-1, 3.16-2, 3.16-5 and 3.16-7) to show that tribes are minority and low income within the area of analysis and subject to potential environmental justice effects. The methodology utilized in the environmental justice evaluation presented in Section 3.16.4.2 is described in Section 3.16.4.1 *Effects Determination Methods*.	No
AO_LT_1230_071-149	Section 3.16.3.1 compares the percentages of minority and low income populations within the counties of the Klamath Basin to the percentages in the relative states of California and Oregon. If the county percentages are lower than the states, the population is considered a minority or low income that could be disproportionately affected. For minority populations, this comparison is done in Table 3.16-1 and stated in text on p. 3.16-3. For low income, this comparison is done in Table 3.16-3 and stated on p. 3.16-8.	No

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AO_LT_1230_071-150	The comment identified a minor error in the EIS/EIR. To be technically correct, we have revised the text in the EIS/EIR to read "The Klamath River Basin was once the third most productive salmon run on the U.S. west coast, exclusive of Alaska (Institute for Fisheries Resources and Pacific Coast Federation of Fishermen's Associations 2006), a feature that native people ritually managed for thousands of years (Karuk Tribe 2010, as cited in DOI 2012a)."	Yes
AO_LT_1230_071-151	The clause "particularly hydroelectric generation" has been deleted in the Final EIS/EIR.	Yes
AO_LT_1230_071-152	The Salter 2003 report, the source of the information on willow shoots, is a white paper produced on behalf of the Karuk Tribe concerning the effect of Klamath Hydroelectric Project on traditional resource use and cultural practices. This report includes anecdotal accounts by Karuk tribal members on the changing condition of basket making materials Given that the Environmental Justice Section 3.16 is analyzing impacts to tribal members, first-hand accounts of tribal basket weavers on the condition of basket weaving materials seem an appropriate information source to include in the Affected Environment of the Environmental Justice Section 3.16. The Salter report provides context for the Current Effects Background Technical Report (DOI 2012a); both Salter 2003 and the *Current Effects of Implementing the KHSA and KBRA on Indian Trust Resources and Cultural Values* (DOI 2012a) document the perspective of the federally recognized tribes in the Klamath Basin. Quantifiable data on Project effects to water, aquatic, and terrestrial resources are found in Sections 3.2, 3.3, 3.4, and 3.5. To clarify the process used to develop the Current Effects Background Technical Report and Potential Effects Background Technical Report language has been added to Section 3.12, as well as, Table 3.12-1 through Table 3.12-6.	Yes
AO_LT_1230_071-153	To reflect the suggestions made in this comment, text has been added to Section 3.16 on Klamath on dam effects to migrating fish. The text cites the following source; "A Study to Determine the Feasibility of Establishing Salmon and Steelhead in the Upper Klamath Basin" (1966) prepared by Oregon State Game Commission and Pacific Power and Light Company, available at http://www.fws.gov/yreka/HydroDocs/Fortune-etal-1966.pdf.	Yes
AO_LT_1230_071-154	In response to this comment, the following text has been added to the introduction to Section 3.16.3.2.	Yes

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	As part of the study for the Current Effects Background Technical Report, government-to-government consultations were conducted with the six basin tribes to solicit input from the tribal governments regarding their assessment of effects on Indian trust resources, tribal rights to take those resources, other resources traditionally used by tribes, and cultural values related to those resources and rights within the study area resulting from the current operations of the four PacifiCorp dams on the Klamath River. The reader should note that inclusion of any claims and assertions put forth by these tribes does not necessarily imply that the U.S. government endorses those views. Three rounds of consultation meetings were held between the Cultural/Tribal Sub-team and each of the six tribal governments The purpose of the first consultation meetings (Round 1) was for the Sub-team to describe the process of the Current Effects Background Technical Report, elicit information about the histories and backgrounds of the tribes, and discuss how the dams might be currently affecting their resources and rights and related cultural values. In response, the Yurok, Resighini, Karuk, and Klamath Tribes provided comprehensive background documents. The Round 2 meetings were conducted to collect comments from the tribes concerning the Current Effects Background Technical Report and the potential effects of the Dams In Scenario and the Dams Out Scenario on their trust and other resources and rights. In Round 3, the Sub-team sought comments from the tribes on the first draft of the Potential Effects Background Technical Report. Quantifiable data on Project effects to water, aquatic, and terrestrial resources are found in Sections 3.2, 3.3, 3.4, and 3.5. To clarify the process used to develop the Current Effects Background Technical Report and Potential Effects Background Technical Report language has been added to Section 3.12, as well as, Table 3.12-1 through Table 3.12-6.	
AO_LT_1230_071-155	Master Response AQU-17 Expert Panel Second Line of Analysis, Not the only line of Evidence. Master Response AQU-28 FERC Conclusions for Disease. Contrary to the assertion that “uncertainty is very high on factors controlling disease polychaete host abundance and disease infection prevalence” in Bartholomew and Foott (2010) and on p. 2 of Foott et al. (2011) the factors associated with determining a region of high infectivity to salmonid fishes are discussed as follows:	No

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	"Disease occurs when the following parameters coincide: • microhabitats with low velocity, stable flows (high density polychaete habitat) • high numbers of spawning adult salmon (myxospore input) • temperatures above 15°C (increases rate of disease in fish)" Bartholomew and Foott (2010) state on p. 11 that slow flowing habitats such as runs and eddy-pools had the highest relative densities and frequency of occurrence of *M. speciosa*. The restoration of variable flow conditions as a result of dam removal is expected to result in a dynamic flow regime that would decrease the stability of the microhabitats that support polychaete populations and thus decrease polychaete abundance in the infectious zone (Stocking and Bartholomew 2007). Additionally, Bartholomew and Foott (2010) state that because the KRBA provides flexibility to manage flows to respond to real-time climatic and biological conditions they expect that this would create variability in flows and resulting habitat conditions and reestablish natural instability and disturbance of microhabitats preferred by polychaetes (Bartholomew and Foott 2010; p. 21). As noted in the Draft EIS/EIR on p. 3.3-88 for Alternatives 2 and 3, increased variability in flow management, and the restoration of a more natural sediment regime, would likely reduce the suitability of habitat conditions for *M. speciosa,* the invertebrate host for *P. minibicornis* and *C. 74hasta*. The Draft EIS/EIR on p. 3.3-88 has been revised to cite Stocking and Bartholomew (2007) and Bartholomew and Foott (2010) in this regard. In regard to the effects of spawner abundance on *C. 74hasta*, Bartholomew and Foott (2010) state on p. 12 that the spatial overlap of both hosts is a key factor in predicting where parasite abundance would be increased, and the formation of an infection nidus could be explained by a high concentration of spawning adult salmon [meaning carcasses] in the reach below the dam, which provides myxospores to infect the dense polychaete populations in the reach below. The Federal Energy Regulatory Commission's additional analysis is that restoring access to reaches above Iron Gate Dam for anadromous fish would allow adult fall Chinook salmon to distribute over a greater length of the river, reducing crowding and the concentration of disease pathogens that currently occur in the reach between Iron Gate Dam and the Shasta River (Federal Energy Regulatory Commission 2007). P. 3.3-88 of the Draft EIS/EIR, Alternative 2, Fish Disease and Parasites, has	

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	been revised to add this text from the Federal Energy Regulatory Commission. Alternatives 4 and 5 will likewise be revised. On p. 3.3-152 of the Draft EIS/EIR the section that read "a small proportion of spawning salmon produce the bulk of myxospores" has been replaced with 'while the percentage of adult carcasses with myxospores (parasite stage that infects the polychaete host) is relatively low, there is a direct relationship between carcass number and quantity of myxospores in the system (Scott Foott, U.S. Fish and Wildlife Service, pers. Comm.). The Draft EIS/EIR on p. 3.16-16, Resighini Rancheria, Effects of Dams – Water Quality**,** has been revised to state that 'The stable flows and warm water on the Klamath River, especially between the Shasta River and Seiad, contain elevated levels of the parasites that carry the fish diseases *Parvicapsula* minibicornis and *Ceratomyxa shasta…'.* In regard to the citation regarding "California Department of Fish and Game 2004" and the 2002 fish kill, disease related mortalities of juvenile and adult salmonids have been documented in the Klamath River and major tributaries downstream from Iron Gate Dam in more recent years by the KFHAT (2005).	
AO_LT_1230_071-156	Text has been changed in Section 3.16, Environmental Justice, to reflect the text in the Current Effects Background Technical Report.	Yes
AO_LT_1230_071-157	This section states concerns represented by the tribes as collected through government to government consultation and documented in the Current Effects Background Technical Report. Text has been added to the introduction discussing the source of information in this section. Text has also been added that indicates NOAA Fisheries Service Biological Opinion sets flow requirements downstream from Iron Gate Dam and references Section 3.3 p. 3.3.42 and Table 3.3-4.	Yes
AO_LT_1230_071-158	This section states concerns represented by the tribes as collected through government to government consultation and documented in the Current Effects Background Technical Report. Text has been added to the introduction discussing the source of information in this section.	Yes
AO_LT_1230_071-159	The Environmental Justice discussion in Section 3.16 of the Draft EIS/EIR was complete as required by Executive Order 12898. The Council on Environmental Quality's (CEQ) document is	No

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	guidance on how to complete Environmental Justice evaluations for NEPA. Although not specified in Section 3.16, the Environmental Justice analysis does address the principles for considering Environmental Justice under NEPA stated in the CEQ guidance.	
AO_LT_1230_071-160	Text revised to clarify that water quality would continue to be degraded consistent with impact determinations in Section 3.2, Water Quality.	Yes
AO_LT_1230_071-161	The comment author refers to the Environmental Justice section (Section 3.16) of the Draft EIS/EIR. However, Section 3.3.4.1 of the Draft EIS/EIR provides a comprehensive analysis of potential effects on aquatic resources (including endangered suckers) resulting from the various alternatives considered. Additionally, The expert panel on resident fish (Buchanan et al. 2011) provides an assessment of the potential effects of the Proposed Action on the listed suckers (p. 47-56). This information is incorporated into the Draft EIS/EIR. Buchanan et al. (2011a) finds that under Conditions without Dams and with the KBRA, water quality conditions in Upper Klamath Lake are likely to improve particularly in restored wetlands and open water areas adjacent to wetlands so that growth and survival of the suckers in Upper Klamath Lake increases. It is also anticipated that levels of parasitism and disease would be lower with better water quality because fish would have lower stress levels and stronger immune systems. Water quality has already improved in larval and juvenile sucker rearing areas with the reconnection of the Williamson River Delta where high quality Williamson River water mixes with Upper Klamath Lake water. With the reconnection of the Agency Lake Ranch, Barnes Ranch, and Wood River Wetlands additional emergent wetland and shallow shoreline habitat would immediately have better water quality because of the influence of mixing of high quality tributary inflows from Wood River and Sevenmile Creek. In summary, Buchanan et al. (2011a, p 76) concluded that the Proposed Action provides greater promise for preventing extinction of endangered suckers and for increasing overall population abundance and productivity. As stated, the comment provides no information that analysis is absent to support the conclusion that removal of these dams would aid in the recovery of suckers and is factually incorrect.	No

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AO_LT_1230_071-162	Section 3.15 summarizes effects to tribes and commercial fishing as a result of increased fish populations under the Proposed Action. The Commercial Fishing Economics Technical Report describes the methodology applied to evaluate increases in commercial fishing activity and revenues. The Sociocultural/ Socioeconomics Effects Analysis Technical Report for each tribe discuss potential economic effects of increased fishing for commercial and subsistence purposes. All reports are available at klamathrestoration.gov. Text has been added to this paragraph that references Section 3.15 and the technical reports.	Yes
AO_LT_1230_071-163	Text has been revised in Section 3.16, Environmental Justice, to reflect the comment author's suggestion.	Yes
AO_LT_1230_071-164	The text of the EIS/EIR has been revised to address the comment.	Yes
AO_LT_1230_071-165	The text of the EIS/EIR has been revised to address the comment.	Yes
AO_LT_1230_071-166	Master Response WQ-4B Hydroelectric Project Impacts to Water Quality & Anticipated KHSA/KBRA Improvements. Master Response WQ-27 Nutrient Retention With Dams, Nutrient Release Without Dams, and Periphyton. Master Response WQ-6 Periphyton Growth and Fish Disease.	No
AO_LT_1230_071-167	Tables 3.20-2 and 3.20-3 present existing recreational opportunities in the Klamath Basin. These tables are not meant to analyze the suitability of substitute recreation opportunities. The analysis of the need for and location of substitute recreation opportunities in the region is presented in Draft EIS/EIR Section 3.20.4.3.	No
AO_LT_1230_071-168	Master Response REC-1 Regional Recreation Resources.	Yes
AO_LT_1230_071-169	Master Response REC-1 Regional Recreation Resources. Master Response REC-3 Mitigation Measure REC-1.	Yes
AO_LT_1230_071-170	Please see Draft EIS/EIR p. 3.20-46 for an analysis of changes to whitewater boating at Hell's Corner. The loss of whitewater boating in this reach would be significant and unavoidable. The pages referenced in the comment discuss impacts on flows in the Keno Reach and reaches downstream from Iron Gate Dam not	No

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	the Hell's Corner Reach. The text was clarified to make this discussion and analysis more obvious. Modeling showed negligible flow changes in the Keno Reach and downstream from Iron Gate Dam, and flow increases in J.C. Boyle and Copco bypass reaches. Data presented throughout Section 3.20 and in Appendix R discuss modeled changes in flow at different periods of the year in the J.C. Boyle and Copco 2 bypass reaches. Master Response RE-6 Chanel Flows Following Dam Removal.	
AO_LT_1230_071-171	Change has been made. Species-specific analysis is presented in the Section 3.15, Socioeconomics, and a reference to this analysis was added to Section 3.20, Recreation.	Yes
AO_LT_1230_071-172	The text of the EIS/EIR has been revised to address the comment.	Yes
AO_LT_1230_071-173	As noted in Section 3.21.4.1 and in Figures 3.21-2 through 4 of the Draft EIS/EIR, the Environmental Data Resources (EDR) search that was completed along a 2 mile buffer in three corridors. The site noted by the comment author is within the area of analysis described in Draft EIS/EIR Section 3.21.1.	No
AO_LT_1230_071-174	The text of the EIS/EIR has been revised to address this comment.	Yes
AO_LT_1230_071-175	Figure 3.21.-1 the Draft EIS/EIR has been revised to address this comment. The author of this section rechecked with the School District and was informed that all of the schools are currently active. Text regarding school status has not been changed.	Yes
AO_LT_1230_071-176	The paragraph states that "The Proposed Action would benefit county economies by increasing spending and providing temporary employment **during the construction and mitigation period**. The Proposed Action would contribute to increased sales and sales tax revenues by bringing workers into the region. Under the cumulative condition, the Proposed Action would not contribute to **long-term** employment, income, or output in the regional economy" This statement is true. Construction activities associated with dam removal would increase economic output, employment, and labor income during the construction period in Klamath and Siskiyou Counties. The increased economic output would only	No

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	occur during construction (2020) and mitigation (2018-2025); there would be no long-term increases in economic output after the construction and mitigation period is over. This is consistent with the **Klamath Regional Economics Fact Sheet** that shows the majority of the jobs created in Klamath and Siskiyou Counties would be short term with implementation of Full Facilities Removal.	
AO_LT_1230_071-177	Section 4.4.16 of Chapter 4 in the Draft EIS/EIR, p. 4-166 states that "The 2020 population projection for Siskiyou County is 51,283, an increase of 4,174 from 2010 (Siskiyou County Community Development Department 2010). The Siskiyou County General Plan (2010) states that based on current population and housing trends, there will be a need for an additional 720 new residential units in the county by the year 2014 (Siskiyou County 2010). The projections do not extend to 2020; however, the Lead Agencies assume that there will still be some housing needs within the Siskiyou County. Klamath County's population is expected to increase from 66,243 in 2008 to 71,440 in 2020 (U.S. Census Bureau, 2006-2008 Community Survey; Klamath County Planning Department 2009). No housing estimates are available for the year 2020. The Klamath Falls urban growth boundary is expected to experience the most growth of all urban areas in Klamath County over the next twenty years. The forecasted range for the Klamath Falls urban growth boundary population in 2020 is 47,420 to 49,471, from 44,321 in 2007 (Klamath County Planning Department 2009)." These population projections are independent of Reclamation's Klamath Project and are projected to occur in the future without the project. A sentence has been added to the paragraph to refer the reader to Section 4.4.16, which explains these projections are independent of Reclamation's Klamath Project.	Yes
AO_LT_1230_071-178	The figure isn't meant to depict rate of removal. The associated text states "Data from June through November during 2000-2005 indicate that the largest relative decrease in mean Total Suspended Solids (TSS) in the upper Klamath River occurs between Link River Dam and Keno Dam (Figure C-7, Raymond 2008), where mean values dropped from approximately 14 mg/L at Link River at Klamath Falls (RM 253.1) to near 8 mg/L at Keno Dam (RM 233.0)." The caption in the figure indicates that the data was collected from various sites in the Klamath River. The comment does not indicate how changing the x-axis label to "Station RM" from "River Mile" would provide additional clarity. No change made.	No

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AO_LT_1230_071-179	Change made with slight revisions: "a relatively small (3.4 percent) fraction of total inorganic sediment supplied to the Klamath River on an annual basis originates from the upper and middle Klamath River (i.e., from Keno Dam to the Shasta River) (Stillwater Sciences 2010)…"	Yes
AO_LT_1230_071-180	The statements are not contradictory, but they do recognize that the general trend of decreasing suspended materials through the Hydroelectric Reach to the river immediately downstream from Iron gate Dam can be interrupted by periodic seasonal algal blooms that are transported from Copco 1 and Iron Gate Reservoirs into the Klamath River.	No
AO_LT_1230_071-181	The fraction of the annual sediment load that is from 'natural erosion processes' (that we infer to be background sources) is only estimated for areas where TMDL sediment source studies have been conducted. It has been estimated for Trinity River and Scott River, but it is unknown what that load is as a fraction of the total load in the Klamath River. The most relevant metric for inclusion in the EIR/EIS is the current sediment load (not the fraction of the load that is background). Thus, we have revised the text in the final EIR to read: "Mass wasting, bank erosion, and other natural erosion processes contribute a large but currently unknown portion of the total fine sediment supply to the lower Klamath River, along with management activities such as timber harvest and road construction along tributaries (United States Forest Service 2004, Stillwater Sciences 2010)."	Yes
AO_LT_1230_071-182	The phrase "appears to have been" has been changed to "may have been". Additionally, revisions to Section 3.4 have been made to clarify that riverine conditions can support accumulations of blue-green algae (for specific text edits, see responses to comments made on this subject in Draft EIS/EIR Section 3.4).	Yes
AO_LT_1230_071-183	Comment noted. The following sentence has been added to Draft EIS/EIR Section C.3.1.3: "The high variability in the historical TP data is likely due to the varying sample size at each location, with some locations experiencing many fewer samples over the roughly 50-year data collection period (including some data points prior to the construction of Iron Gate Dam in 1962)."	No
AO_LT_1230_071-184	Draft EIS/EIR Figures C-12 and C-13 depict data from Asarian et al. (2010) that show the extent of nutrient reduction. Numerous PacifiCorp reports have been cited in Appendix C and Section 3.2 of the Public Draft EIS/EIR, which include nutrient concentrations in the Project reservoirs and, where available, at river locations. The Draft EIS/EIR is clear that the two largest Project reservoirs (Copco 1 and Iron Gate Reservoirs) retain	No

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	nutrients on an annual basis. Nutrient model results from the FERC record are not available in a format that is easily presentable (i.e., longitudinal trends by station or over time) in the EIS/EIR and the comment does not state how additional work to present this information in a concise manner would alter the analysis conducted for the EIS/EIR or would change any effects determinations.	
AO_LT_1230_071-185	The referenced sentence states that TP concentrations downstream from Iron Gate Dam "during August-November" are an exception to the general downward trend in nutrients with distance downstream in the Klamath River, not that TP concentrations are an exception. No change is required.	No
AO_LT_1230_071-186	As presented in the Draft EIS/EIR, the available information indicates that the reservoirs retain nutrients on an annual basis, but can release TP on a seasonal basis. Understanding the annual and seasonal nutrient dynamics is important for anticipating effects of the Project alternatives on water quality. The comment doesn't indicate why the net source/sink is the "more important issue" for the EIS/EIR analyses nor does it explain why ignoring the potential seasonal effects is a good idea. Lastly, in Draft EIS/EIR Section 3.2.4.3.2.3 Nutrients – Lower Klamath Basin, the results of an empirical analysis by Asarian et al. (2010) clearly indicate that dam removal would increase nutrient transport to the lower Klamath River, offering further support for the idea that the dams are overall (annual) nutrient traps. No change is required.	No
AO_LT_1230_071-187	The comment is incorrect. As shown in Figure C-12, in three of four years (2005-2008), TP concentrations immediately downstream from Iron Gate Dam (green triangles) exceed concentrations in the river upstream of Copco 1 Reservoirs (blue X's) during the growth season i.e., September/October). No change is required.	No
AO_LT_1230_071-188	As shown in Figure C-12, in three of four years (2005-2008), TP concentrations immediately downstream from Iron Gate Dam (green triangles) exceed concentrations in the river upstream of Copco 1 Reservoirs (blue X's) during the growth season i.e., September/ October). The comment that "Peak late summer and fall loads conveyed downstream by the Klamath River are effectively shifted to mid-late fall, which is out of the peak primary production periods due to shorter day length in that period" is not a compelling argument since there are numerous documented instances of large nuisance and/or noxious blue green algae blooms that occur in the reservoirs during the mid-late fall (i.e., October, November), even though this timeframe is "out of the	No

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	peak primary production period" as indicated in the comment. No change is required.	
AO_LT_1230_071-189	The referenced text has been revised as follows: "Although there are limited data during winter months when the reservoirs are mixed, concentrations of orthophosphate appear to be more constant throughout the water column, while in stratified periods (i.e., May–October/November) concentrations near the bottom of the reservoirs can reach relatively high levels. For example, orthophosphate concentrations in the bottom waters of Copco 1 Reservoir reached 1.4 mg/L in September and October of 2008 and 2009, while surface water concentrations were approximately 0.2-0.3 mg/L (see Figure 26 in Raymond [2009] and Figure 22 in Raymond [2010]). Orthophosphorus concentrations in Iron Gate Reservoir during this same period exhibited less of a vertical gradient (< 0.1 mg/L), although there were slightly greater concentrations near the bottom sediments (see Figure 26 in Raymond 2009 and Figure 25 in Raymond 2010)."	Yes
AO_LT_1230_071-190	The statement "and introducing the potential for episodic in-reservoir toxicity events depending upon reservoir mixing conditions" has been deleted.	Yes
AO_LT_1230_071-191	We assume that the comment refers to periphyton growth downstream from Iron Gate Dam. Draft EIS/EIR Section C.3.1.4 states the following: "Data presented in Asarian et al. (2009) suggest that much of the TP released from Copco 1 and Iron Gate Reservoir sediments during summertime anoxia remains in the hypolimnion until the reservoirs begin to turn over in the fall, rather than being released to downstream river reaches during the summer period of peak periphyton growth. However, in many years total phosphorus (TP) concentrations during August through October have been observed to be higher downstream from Iron Gate Dam than upstream of Copco 1 Reservoir corresponding to peak in-reservoir algal blooms and indicating that some release of TP can occur at times that downstream periphyton growth downstream may be stimulated." Additionally, the Draft EIS/EIR Section 3.4.4.3.2 analysis of the effects of increased nutrients on periphyton growth in the Klamath River downstream from Iron Gate Dam under the Proposed Action indicates the following: "Because of these many competing factors, some that may favor enhanced periphyton growth downstream from Iron Gate Dam (i.e., increased nutrients transport), and some that counteract this response (increased uptake of nutrients by periphyton in the Hydroelectric Reach, increased frequency and intensity of scouring events, decreasing nutrient concentrations due to TMDL implementation and KBRA	No

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	nutrient reduction programs [see KBRA discussion below]), it is likely that increases in periphyton growth below Iron Gate Dam would be less than significant."	
AO_LT_1230_071-192	There was more than one sentence in the prior section indicating that the reservoirs serve as TP and TN sinks on an annual basis. To provide further clarity, the following sentences (which were already included in some form in the prior section) have been revised.	Yes
AO_LT_1230_071-193	There is no conflict, since the Asarian et al. (2010) analysis describes negative retention (i.e., possible nutrient additions) in the lower reaches of the Klamath River, which is a loading issue and is tied to flows, while the referenced statements about "levels" refer to nutrient concentrations, which can increase even if loading decreases. The terminology in the referenced sections has been clarified to distinguish between loading calculations and concentrations.	Yes
AO_LT_1230_071-194	The objective has been clarified as an "instantaneous minimum concentration" in the text and the table caption. The 2004-2006 analysis was conducted by NCRWQCB for development of the Klamath River TMDL and represents a large number of data points for the Klamath River downstream from Iron Gate Dam. As stated in footnote no. 1 to Table C-2, "Dissolved oxygen measurements were collected at 30-minute increments for a total of forty-eight daily measurements."	Yes
AO_LT_1230_071-195	Prior to the 2010 Basin Plan amendment that revised the dissolved oxygen criterion based on reach-specific percent saturation and typical ambient water temperatures, dissolved oxygen monitoring data in the Klamath River were typically reported using concentration units. The 2010 amendment decreased the minimum dissolved oxygen criteria for summer/early fall months when water temperatures are warmest and dissolved oxygen is naturally lower in the water column. Rather than retroactively assign compliance or noncompliance to data collected prior to the new amended criteria, the Draft EIS/EIR compares pre-2010 data to the pre-2010 criterion and 2010 (and later) data to the 2010 amended criteria.	No
AO_LT_1230_071-196	This data is reported in Draft EIS/EIR Appendix C, Section C.5.1.3 Link River Dam to Klamath River upstream of J.C. Boyle Reservoir. As the section is clearly marked as "upstream of J.C. Boyle Reservoir", there is no reason to clarify that pH levels are not influenced by Reclamation's Klamath Project.	No

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AO_LT_1230_071-197	Draft EIS/EIR Figure C-20 is taken directly from the Karuk Tribe report cited in the caption (Karuk Tribe of California 2007). The comment is accurate regarding the correct way to calculate the average pH of a data set. However, the narrative discussion of the data in Figure C-20 references only the daily maximum and minimum values (i.e., the mean values presented in the figure are not discussed). The requested change would make the figure more technically accurate; however, since the reported mean values are not analyzed in the Draft EIS/EIR, the level of effort required is beyond the scope of the EIS/EIR analysis.	No
AO_LT_1230_071-198	Stating that the Hydroelectric Reach has little net effect on median chlorophyll-a values based on the data presented in Figure C-28 is misleading. The statement ignores the evidence that the decreasing trend in riverine chlorophyll-a starting at Link River Dam and moving downstream is interrupted by large summer and fall blooms of blue-green algae in Copco 1 and Iron Gate Reservoirs, which increase chlorophyll-a concentrations. Thus, the “net effect” of the Hydroelectric Reach is to shift the location in the river at which median seasonal chlorophyll-a concentrations decrease to less than or equal to 10 ug/L, from approximately RM 228 to RM 179, or a downstream shift of approximately 50 miles.	No
AO_LT_1230_071-199	Stating that the Hydroelectric Reach has little net effect on median chlorophyll-a values based on the data presented in Figure C-28 is misleading. The statement ignores the evidence that the decreasing trend in riverine chlorophyll-a starting at Link River Dam and moving downstream is interrupted by large summer and fall blooms of blue-green algae in Copco 1 and Iron Gate Reservoirs, which increase chlorophyll-a concentrations. Thus, the “net effect” of the Hydroelectric Reach is to shift the location in the river at which median seasonal chlorophyll-a concentrations decrease to less than or equal to 10 ug/L, from approximately RM 228 to RM 179, or a downstream shift of approximately 50 miles. While water quality (e.g., chlorophyll-a concentrations) just upstream of Copco 1 Reservoir may exhibit greater variability due to hydropower peaking activities, existing conditions data for algal-derived (organic) suspended materials indicate that algal blooms originating in Upper Klamath Lake largely settle out of the water column in the Keno Impoundment (i.e., upstream of the Project reservoirs) (Draft EIS/EIR Section 3.2.3.3,p. 3.2-23 to 3.2-24, and [Appendix] Sections C.2.1.3 and C.2.1.4, p. C-12 to C-15). Further decreases in concentrations of algal-derived (organic) suspended materials can occur downstream from Keno Dam, which may be due to the mechanical breakdown and	No

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	settling of algal remains in the turbulent river reaches between Keno Dam and Copco 1 Reservoir, as well as by dilution from the springs downstream from J.C. Boyle Dam. Overall, median chlorophyll-a concentrations have decreased to roughly 3 ug/L by the time they are in J.C. Boyle Reservoir and the bypass and peaking reaches (based on 2005-2007data, see Figure C-28).	
AO_LT_1230_071-200	Draft EIS/EIR, Appendix C, Figure C-32 is a box and whisker plot that shows a distribution of data at each station. While it does show general longitudinal trends in microcystin concentrations at several locations in the Klamath River during 2009, this figure is not designed to illustrate how many individual exceedances of WHO guidelines have occurred in the Klamath River downstream from Iron Gate Dam. Draft EIS/EIR Figure C-30 is more informative in that regard. The microcystin figures provided in the Draft EIS/EIR are adequate for the purpose(s) for which they are used.	No
AO_LT_1230_071-201	The portion of the sentence “indicating that M. aeruginosa was being transported into the estuary from upstream reservoir blooms” has been deleted. Additionally, revisions to Section 3.4 have been made to clarify that riverine conditions can support accumulations of blue-green algae (for specific text edits, see responses to comments made on this subject in EIS/EIR Section 3.4).	Yes
AO_LT_1230_071-202	A significant 5-year effort was employed by the NCRWQCB in collaboration with PacifiCorp and working jointly with USEPA Region’s 9 and 10, Oregon Department of Environmental Quality, and USEPA’s contractor TetraTech on the modeling work for the TMDL. That work was subject to extensive peer review and public comment before the NCRWQCB adoption. It was further reviewed and subject to additional public comment before approved unanimously by the SWRCB. It was then subsequently reviewed and approved by the U.S. Environmental Protection Agency. Along with the KRWQM developed by PacifiCorp for the FERC process, the Klamath River TMDL model represents best available science and therefore meets the requirements for NEPA and CEQA.	No
AO_LT_1230_071-203	The without Iron Gate, Copco 1, and J.C. Boyle Dams scenarios (WIGCJCB) were utilized. This has been added to the table and footnotes.	Yes
AO_LT_1230_071-204	Removed footnotes 4 and 6 for KRWQM and added TMDL years to ‘existing conditions’ for flows. Note that “Analysis year(s)” is already presented as a separate row and years are given for both models.	Yes

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AO_LT_1230_071-205	The list referenced in the comment is not a list comparing major differences between the KRWQM and the Klamath TMDL model. Rather, as stated, it is a list comparing major differences between the existing numeric models and the conditions considered for the Klamath Facilities Removal EIS/EIR water quality analysis. In other words, the point of the list in Appendix D is to disclose instances where the existing models simulate conditions that are not directly analogous to the conditions anticipated under Reclamation's Klamath Project alternatives. While there are certainly differences between KRWQM and the TMDL model, the comment does not clarify how these differences would affect the analysis of potential effects of the alternatives on water quality, particularly since results of both the KRWQM and the Klamath TMDL model results are considered as part of the water quality analyses where possible.	No
AO_LT_1230_071-206	This comment appears to be directed at the following document cited in Draft EIS/EIR Section 3.3 (p. 3.3-96 and 3.3-101): "Water Quality Subgroup 2011. Assessment of long term water quality changes for the Klamath River basin resulting from KHSA, KBRA, and TMDL and NPS reduction programs." The premise of the comment is faulty. The referenced document does not "assume that the TMDLs are reasonably certain to be achieved." On the contrary, p. 11 of the referenced document states "Under the No Action alternative, the State water quality agencies would continue working with entities responsible for TMDL allocations, as well as other stakeholders, developing and implementing projects to progress towards meeting water quality objectives and TMDL targets; these target may or may not be achieved by 2062." Additionally, with respect to the Proposed Action, the referenced document states the following on p. 11 and 12: "Under the Proposed Action, dam removal is expected to result in significant temperature, dissolved oxygen and cyanobacteria improvements; and nutrients and organic matter reductions are expected to be accelerated, relative to those achieved under a no action (dams in) scenario. As such, improvements to water quality have greater likelihood of approaching the TMDL targets by the end of the analysis period (i.e., 2062)." The remaining aspects of this comment (i.e., references to the Expert Panel reports and PacifiCorp general issues with the Klamath River TMDL models) are addressed in numerous other responses to PacifiCorp comments on the Draft EIS/EIR. A response to the last sentence in the comment is not required under CEQA or NEPA because the comment does not raise a significant environmental issue (CEQA Guidelines, Section 15088; NEPA Regulations 40 CFR Part 1503.4). Many comment	No

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	authors expressed personal opinions, histories or experiences which are not appropriately addressed as part of the NEPA/CEQA process. This comment will be included as part of the record and made available to decision makers prior to a final decision on the Proposed Action.	
AO_LT_1230_071-207	This comment appears to be directed at the following document cited in Draft EIS/EIR Section 3.3 (p. 3.3-96 and 3.3-101): "Water Quality Subgroup 2011. Assessment of long term water quality changes for the Klamath River basin resulting from KHSA, KBRA, and TMDL and NPS reduction programs." The Draft EIS/EIR addresses the multiple water quality, fisheries, and algae points raised in the comment in Sections 3.2, 3.3, and 3.4.	No
AO_LT_1230_071-208	This comment appears to be directed at the following document cited in Draft EIS/EIR Section 3.3 (p. 3.3-96):" Water Quality Subgroup 2011. Assessment of long term water quality changes for the Klamath River basin resulting from KHSA, KBRA, and TMDL and NPS reduction programs." The PacifiCorp (2011b) report was not available in time for it to be incorporated into the Water Quality Subgroup (2011) document. The Water Quality Subgroup (2011) document is final. Further, the technical points raised in this comment are addressed in other responses to PacifiCorp comments that are focused on the Draft EIS/EIR text regarding IM 3 and IM 5 (AO_LT_1230_071-48, AO_LT_1230_071-71).	No
AO_LT_1230_071-209	This comment appears to be directed at the following document cited in Draft EIS/EIR Section 3.3 (p. 3.3-96):" Water Quality Subgroup 2011. Assessment of long term water quality changes for the Klamath River basin resulting from KHSA, KBRA, and TMDL and NPS reduction programs." The PacifiCorp (2011b) report was not available in time for it to be incorporated into the Water Quality Subgroup (2011) document. The Water Quality Subgroup (2011) document is final. Further, the technical points raised in this comment are addressed in other responses to PacifiCorp comments that are focused on the Draft EIS/EIR text regarding IM 3 and IM 5 (AO_LT_1230_071-48, AO_LT_1230_071-71).	No
AO_LT_1230_071-210	<u>Concern 1</u> Barth. and Foot (2010) Disease Report 2. This comment concerns the Bartholomew and Foott (2010) report only and, as such, a response to this comment is not required under CEQA or NEPA because the comment does not raise a significant environmental issue (CEQA Guidelines Section 15088; NEPA Regulations 40 CFR §1503.4). Many comment authors	Yes

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	expressed personal opinions, histories or experiences which are not appropriately addressed as part of the NEPA/CEQA process. This comment will be included as part of the record and made available to decision makers prior to a final decision on the Proposed Action. The Lead Agencies have complied with NEPA and CEQA at all stages of the process, and gave the public the opportunity to provide input. Concern 2 Barth. and Foott (2010) Disease 14: The comment correctly cites the Bartholomew and Foott (2010) discussion that "Chinook and coho salmon originating from areas above or within the infectious zone appear to be more resistant than Trinity River Hatchery stocks. This suggests that fish migrating longer distances in the mainstem river are subject to greater selection pressure by the parasite." However, as noted in the preceding sentence in Bartholomew and Foott (2010), while "differences in susceptibilities of Klamath River stocks of both species have also been examined …data is not comprehensive." Without more comprehensive information definitive conclusions are not possible regarding disease mortality to fish migrating longer distances in the Klamath River. The Fish Disease and Parasites sections of the EIS/EIR have been revised to add the following: Under a scenario of potential dam removal, it is likely that a greater diversity of salmon life histories will evolve, with some of those types more likely to avoid parasite exposure by migrating earlier or over wintering in tributaries and migrating in the fall (Bartholomew and Foott 2010; p. 40) (Alternative 2). Access to the habitat above Iron Gate Dam through other means such as fishways would likely have a similar outcome (added to Alternatives 4 and 5).	
AO_LT_1230_071-211	Removal of Project dams would increase mid-sized (gravel) sediment transport through the reach directly below Iron Gate Dam (RM 190.8) (Federal Energy Regulatory Commission 2007). As noted on p. 3.3-84 of the Draft EIS/EIR, estimates show that under the Proposed Action, sediment mobilization flows from Bogus Creek (RM 190.2) to Willow Creek (RM 185.5) and from Willow Creek to Cottonwood Creek (RM 182.5) would range from 3,000 to 7,000 cfs (1.5 to 2.5 year return period) and 5,000 to 9,000 cfs (1.5 to 3.2 year return period), respectively, lower than existing conditions or the No Action/No Project Alternative. We acknowledge that the eight miles of channel that would have an increased mobility of gravel and cobble is upstream of the portion of the Klamath River channel with the highest polychaete population near Cottonwood Creek. However, actinospores from this 8-mile portion of the Klamath River channel pass	No

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	downstream and infect juvenile salmon in the current infectious zone for juvenile salmon, Shasta R. to Seiad (RM 130) (Bartholomew and Foott 2010). In addition, while the area of significant sediment release and resupply under the dams out Alternatives is just above Cottonwood Creek, bedload sediment transport rates would increase downstream from this point as well (Blair Greimann, BOR, pers. comm.). Since the construction of the lower four PacifiCorp Dams, there has been approximately 3.6 million tons of deposition within these reservoirs. The deposit is approximately 15% sand and 85% silt and clay (Reclamation, 2012d). The sand portion of this deposit would have been transported through the downstream reaches had not the dams been in place. After dam removal, this natural sediment supply of sand, silt, and clay would be restored to the reaches downstream from Iron Gate Dam and also to all the reaches downstream. This increased movement and transport of sediment (sand, silt, and clay) would disrupt polychaete habitat from the current location of Iron Gate Dam to downstream from Shasta River. The Draft EIS/EIR on p. 3.3-87, Alternative 2, section on Fish Disease and Parasites has been revised to explain this. The FERC (2007) concluded that restoring natural sediment transport processes would likely contribute to the scour of attached algae downstream from the current site of Iron Gate Dam, and deposited gravel and sand would provide a less favorable substrate for attached algae because of its greater mobility during high flow events than the existing armored substrate. The reduction in attached algae would provide less habitat for the polychaete intermediate host of C. shasta and P. minibicornis, which should reduce the infection rate of juvenile salmonids downstream from Iron Gate Dam. (Federal Energy Regulatory Commission 2007, p3-314). The Chinook Expert Panel assessment indicated that dams out plus KBRA implementation (Alternative 2 or 3) offers greater potential than the Current Conditions in improving conditions for disease, (Goodman et al. 2011; p. 12).	
AO_LT_1230_071-212	The Bartholomew and Foott (2010) information was considered in the NEPA analysis and that analysis for each alternative has considered the requested information. As noted in the Draft EIS/EIR, Section 3.3.4.3 (Fish Disease and Parasites), for Alternatives 2 and 3, reduction in planktonic food sources, increased variability in flows, and the restoration of a more natural sediment regime and mobile bed, would likely reduce the suitability of habitat conditions for M. speciosa, the invertebrate	Yes

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	host for P. minibicornis and C. shasta. The Draft EIS/EIR on p. 3.3-88 has been revised to cite Bartholomew and Foott (2010) in this regard. While overall, physical polychaete habitat in Reclamation's Klamath Project area would increase with the return of reservoirs to a riverine environment, the extent of suitable habitat is not likely to be as extensive in the current infectious zone because of the steeper gradient in the area bounded by the projects (Bartholomew and Foott (2010). In addition, because the KRBA provides flexibility to manage flows to respond to real-time climatic and biological conditions it is expected that this would create variability in flows and resulting habitat conditions and reestablish natural instability and disturbance of microhabitats preferred by polychaetes (Bartholomew and Foott (2010). The Draft EIS/EIR on p. 3.3-88 has additionally been revised to cite Bartholomew and Foott (2010) in regard to these points as well. Finally, the Draft EIS/EIR has been revised to include the following: 'Restoration of the hydrologic function of the river system is paramount to creating habitat diversity and maintaining biophysical attributes of a river system (Stanford et al. 1996; Poff et al. 1997). Although implementation of Alternative 2 or 3 would not fully restore the natural hydrologic regime of the Klamath River, it would result in a flow pattern that mimics pre dam conditions, having greater intra- and inter-annual variability than exists today with the Klamath Dams in place (Hetrick et al. 2009). Implementation of the KBRA would provide flexibility to manage flows that respond to real-time climatic and biological conditions, thereby enhancing the diversity in flow and water temperature. Restoring these dynamic conditions in the Klamath River would create instability and disturbance in microhabitat conditions that we expect would reduce polychaete populations (Stocking and Bartholomew 2007) and presumably, reduce infection rates within polychaete populations (Hetrick et al. 2009).' In addition, we anticipate that the higher flows modeled under the KBRA during the late winter and spring months, when combined with tributary accretions below Keno Dam that are currently being regulated by PacifiCorp Project Dams, would increase the frequency of flows that mobilize sediment (Hetrick et al. 2009). The increases in sediment mobilization events are anticipated to have a positive effect on the aquatic environment. These benefits include decreasing the retention and stability of fines and the associated establishment of excessive aquatic vegetation,	

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	which is anticipated to adversely affect microhabitats occupied by polychaete worms (Manayunkia speciosa). As noted in the Draft EIS/EIR on p. 3.3-148 and 3.3-173, under Alternatives 4 and 5, disease impacts would be intermediate to those associated with Alternative 1 and Alternatives 2 (and 3).	
AO_LT_1230_071-213	The comment correctly cites the consideration of Bartholomew and Foott (2010) that earlier warming would likely result in earlier reproductive activity of the polychaete and more rapid colonization. Bartholomew and Foott (2010) did not conclude that earlier warming associated with dam removal would result in a longer exposure time for juvenile migrants as well as increased mortality due to higher stream temperatures. In this regard, the Federal Energy Regulatory Commission (2007) concluded that more rapid cooling of river temperatures in the fall with Reclamation's Klamath Project dams removed may also allow for fall Chinook salmon spawning earlier in the fall. This, in turn, would likely result in earlier emergence and growth, and encourage earlier emigration. Bartholow et al. (2005) also suggest that earlier warming of the river system could trigger juvenile salmonids to outmigrate earlier. This is consistent with findings that accumulated temperature units are more important predictors of migration of juvenile Chinook salmon than flow or photoperiod (Sykes et al. 2009). A predicted earlier outmigration in response to elevated water temperatures in the spring is also supported by a vast body of literature relating to increased growth rates and thermal response of emigrating salmonids (Hoar 1988). In addition, a slight increase in the rate at which water temperatures increase in the spring would be likely to improve the growth rates of newly emerged fall Chinook salmon fry (FERC 2007). Earlier emigration and improved growth would likely mean most outmgrants would avoid periods of high infection of juvenile salmon. The FERC (2007) also concluded that average and daily maximum water temperatures would increase to stressful levels earlier in the summer than currently occurs. The increase in average and maximum daily temperatures, however, may be compensated for by lower temperatures at night, which the NRC (2004) concludes may allow rearing fish to move out of temperature refugia to forage at night, allowing growth to occur even when ambient temperatures are above optimal (FERC 2007).	No

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	Under a scenario of potential dam removal, it is likely that a greater diversity of salmon life histories would evolve, with some of those types more likely to avoid parasite exposure by migrating earlier or over wintering in tributaries and migrating in the fall (Bartholomew and Foott 2010; p. 40).	
AO_LT_1230_071-214	The comment correctly cites Bartholomew and Foott (2010). The EIS/EIR has taken into consideration the following information in responding to this comment: • A lower infectious dose may be important for those fish migrating further distances upriver, and which might be more vulnerable to the effects of disease. Adults become infected as they come out of the estuary (Scott Foott, USFWS, pers. comm.). If these fish pass through the current infectious zone, their infectious load may be increased. Conversely, in the absence of an infectious zone, the infectious dose for migrating fish would probably be lower. However, no data currently exist to definitively confirm this or, more importantly, its potential contribution to disease in the Klamath River and the relative distance that adult salmon migrate. The Fish Disease and Parasites sections of the EIS/EIR have been revised to add the following: Under a scenario of potential dam removal, it is likely that a greater diversity of salmon life histories will evolve, with some of those types more likely to avoid parasite exposure by migrating earlier or over wintering in tributaries and migrating in the fall (Bartholomew and Foott 2010; p. 40) (Alternative 2). Access to the habitat above Iron Gate Dam through other means such as fishways would likely have a similar outcome (added to Alternatives 4 and 5).	Yes
AO_LT_1230_071-215	The comment correctly cites Bartholomew and Foott 2010. The EIS/EIR has taken into consideration the following information in responding to this comment: • A lower infectious dose may be important for those fish migrating further distances, and which might be more vulnerable to the effects of disease. If these fish pass through the current infectious zone, their infectious load may be increased. However, no data currently exist to definitively confirm this or, more importantly, its potential contribution to disease in the Klamath River. Conversely, in the absence of an infectious zone, the infectious dose for migrating fish would probably be lower. Further, while it is possible that salmonid life history Type I Chinook juveniles may be migrating through this zone throughout the period when temperatures are high, other life	Yes

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	histories, such as Type II or Type III Chinook would likely avoid parasite exposure by migrating earlier or over wintering in tributaries or Upper Klamath Lake and migrating in the fall. • The Frequency of disruptive flows projected for post-dam conditions should decrease the stability of polychaete populations in the current infectious zone (Foott et al. 2011). The Federal Energy Regulatory Commission (2007) concluded that restoring natural sediment transport processes would likely contribute to the scour of attached algae downstream from the current site of Iron Gate Dam, and deposited gravel and sand would provide a less favorable substrate for attached algae because of its greater mobility during high flow events than the existing armored substrate. The reduction in attached algae would provide less habitat for the polychaete intermediate host of C. shasta and P. minibicornis, which should reduce the infection rate of juvenile salmonids downstream from Iron Gate Dam (Federal Energy Regulatory Commission 2007, p3-314). The Federal Energy Regulatory Commission's analysis concluded that restoring access to reaches above Iron Gate Dam for anadromous fish would allow adult fall-run Chinook salmon to distribute over a greater length of the river, reducing crowding and the concentration of disease pathogens that currently occur in the reach between Iron Gate Dam and the Shasta River (FERC 2007). • Under Alternatives 4 and 5, dispersal of spawners would thus contribute to improved conditions for disease. The Fish Disease and Parasites sections of the EIS/EIR have been revised to clarify that under Alternatives 4 and 5, disease impacts would be diminished but occur at some level relative to the current condition. • The Fish Disease and Parasites sections of the EIS/EIR have been revised to add the following: Under a scenario of potential dam removal, it is likely that a greater diversity of salmon life histories will evolve, with some of those types more likely to avoid parasite exposure by migrating earlier or over wintering in tributaries and migrating in the fall (Bartholomew and Foott 2010; page 40) (Alternative 2). Access to the habitat above Iron Gate Dam through other means such as fishways would likely have a similar outcome (added to Alternatives 4 and 5)	

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	The Fish Disease and Parasites sections of the EIS/EIR have been revised to add the following: Under a scenario of potential dam removal, it is likely that a greater diversity of salmon life histories would evolve, with some of those types more likely to avoid parasite exposure by migrating earlier or over wintering in tributaries and migrating in the fall (Bartholomew and Foott 2010; page 40) (Alternative 2). Access to the habitat above Iron Gate Dam through other means such as fishways would likely have a similar outcome (added to Alternatives 4 and 5).	
AO_LT_1230_071-216	The statement referenced in this comment is found on p. 44 of Bartholomew and Foott 2010, not p. 44. The comment correctly cites Bartholomew and Foott 2010 and requests the inclusion of these observations in the Final EIS/EIR. These statements have been considered in the analysis of Fish Disease and Parasites under the Alternatives and the EIS/EIR has been revised to inform the Secretary's analysis. We have considered these statements, along with other information, in developing the Secretary's analysis. These statements must be read in a larger context. For instance the Federal Energy Regulatory Commission's additional analysis is that restoring access to reaches above Iron Gate Dam for anadromous fish would allow adult fall Chinook salmon to distribute over a greater length of the river, reducing crowding and the concentration of disease pathogens that currently occur in the reach between Iron Gate Dam and the Shasta River (Federal Energy Regulatory Commission 2007). P. 3.3-88 of the Draft EIS/EIR, Alternative 2, Fish Disease and Parasites, has been revised to add this text from the Federal Energy Regulatory Commission. Alternatives 4 and 5 will likewise be revised. In regard to infection prevalence in adult fish likely being maintained even if *C. shasta* levels are reduced in the infectious zone, the high infection prevalence does not necessarily mean these fish would develop disease or that the infectious load for juveniles will be affected. The continuance of an infectious zone for juveniles would be the result of the synergistic effect of the numerous factors as is the case in the current disease zone from Shasta River to Seiad (Hetrick et al. 2009; Bartholomew and Foott 2010; Hamilton et al. 2011). As noted by FERC (2007), dispersal of spawners would reduce crowding and the concentration of disease pathogens and it is likely that this disease zone would diminish.	No

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	There are a variety of causes of prespawn mortality in Klamath River salmon; however there currently is not reliable data on prespawn mortality in the Klamath River due to *C. shasta* (Scott Foott, USFWS, pers. comm). Thus, until further information is available, the effect on prespawn mortality for fish migrating different distances in the mainstem Klamath River as a result of myxozoan infection cannot be put into proper context. The Chinook Panel indicated that dams out plus KBRA implementation (Alternative 2 or 3) offers greater potential than the Current Conditions in improving conditions for disease (Goodman et al. 2011; p. 12). Dispersal of spawners under Alternatives 4 and 5 would likewise contribute to improved conditions for *C. shasta*. The Draft EIS/EIR has been revised on p. 3.3-148 and 3.3-173 to state that, under Alternatives 4 and 5, *C. shasta* impacts would be diminished relative to the current condition.	
AO_LT_1230_071-217	On p. 3.3-152 of the Draft EIS/EIR the section that read "a small proportion of spawning salmon produce the bulk of myxospores" has been replaced with 'while the percentage of adult carcasses with myxospores (parasite stage that infects the polychaete host) is relatively low, there is a direct relationship between carcass number and quantity of myxospores in the system (Scott Foott, U.S. Fish and Wildlife Service, pers. comm.).' Bartholomew and Foott (2010) state on p. 12 that the spatial overlap of both hosts is a key factor in predicting where parasite abundance will be increased, and the formation of an infection nidus between the Shasta River and Indian Creek could be explained by a high concentration of spawning adult salmon [thus, carcasses] in the reach below the dam, which provides myxospores to infect the dense polychaete populations in the reach below. The FERC's analysis is that restoring access to reaches above Iron Gate Dam for anadromous fish would allow adult fall Chinook salmon to distribute over a greater length of the river, reducing crowding and the concentration of disease pathogens that currently occur in the reach between Iron Gate Dam and the Shasta River (FERC 2007). P. 3.3-88 of the Draft EIS/EIR, Alternative 2, Fish Disease and Parasites, has been revised to add this text from the FERC. Alternatives 4 and 5 have likewise been revised.	No
AO_LT_1230_071-218	Historically, Chinook salmon (both spring and fall-run) were abundant in the tributaries of Upper Klamath Lake, including	No

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	Jenny, Fall, and Shovel Creeks, as well as the Wood, Sprague, and Williamson rivers (Administrative Law Judge 2006). Since salmon and their associated diseases were present historically above Iron Gate Dam, movement of myxospores by adult salmon will likely reintroduce the Chinook-specific C..shasta genotype I above Iron Gate Dam. While it is possible that the current infections nidus (reach with highest infectivity) for C. shasta and P. minibicornis may be recreated upstream where salmon spawning congregations occur, and there is associated uncertainty (Foott et al. 2011), the likelihood of this happening appears to be remote for the following reasons. Any creation of an infectious zone (or zones) would be the result of the synergistic effect of numerous factors, such as those that occur within the current disease zone in the Klamath River in the reach from the Shasta River downstream to Seiad Valley (FERC (2007; Bartholomew and Foott 2010). Here, flows in that reach that mimic natural conditions, combined with reestablishment of natural sediment transport rates, would restore natural geomorphic channel forming processes (Hetrick et al. 2009) necessary to create diverse habitat and reduce the influence of those synergistic factors that currently create conditions favorable for disease. Under a dams out alternative, those conditions that are believed to result in development of an infectious nidus below Iron Gate Dam, or a could result in development of a potential infectious nidus above Iron Gate Dam, are unlikely to occur. Further, the likelihood of those synergistic factors in the Williamson River would be reduced as carcasses would likely be more dispersed in the watershed (Foott et al. 2011), and flow variability will act to reduce polychaete habitat stability above the Williamson River mouth. C. shasta in the Williamson River is currently maintained by planting of susceptible rainbow trout that become infected, likely produce myxospores, and die within a restricted reach in the lower Williamson River. In addition, under a scenario of potential dam removal, it is likely that a greater diversity of salmon life histories will evolve, with some of those types more likely to avoid parasite exposure by migrating earlier or over wintering in tributaries and migrating in the fall (Bartholomew and Foott 2010; p. 40), thus missing the time of year when water temperatures in the Williamson River might possibly be conducive to disease. In some years, maximum temperatures in the Williamson River do not exceed the disease threshold of 15 C (Bartholomew and Foott 2010; Hamilton et al. 2010). The risk of a juvenile salmon disease	

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	response here would be lower than the current zone but not negligible in all water years (Scott Foott, USFWS, 2012, pers. comm.). Historically, it appears spawning concentrations of upper basin Chinook salmon took place primarily in the Sprague River (Lane and Lane Associates 1981). There is no evidence that high densities of polychaetes occur in the Sprague River (Foott et al. 2011). Thus, the synergistic factors that contribute to an infectious nidus for emigrants below Iron Gate Dam and near the Iron Gate Hatchery are unlikely to occur here either. There is some concern regarding a disease zone in the lower Williamson River downstream from the confluence with the Sprague River (Hurst et al. 2012). However, some Chinook emigrants from both these tributaries may very well emerge from groundwater areas early, then rear in Upper Klamath Lake, with growth opportunities that allow them to migrate when they can minimize exposure to C. shasta.	
AO_LT_1230_071-219	Master Response WQ-4B Hydroelectric Project Impacts to Water Quality & Anticipated KHSA/KBRA Improvements. Along with KBRA and TMDL implementation, dam removal is expected to improve water quality in the Klamath River and support numerous designated beneficial uses. Master Response WQ-27 Nutrient Retention With Dams, Nutrient Release Without Dams, and Periphyton.	No
AO_LT_1230_071-220	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather then on the analysis presented in the EIS/EIR. The high degree of overlap in the 95% intervals indicate that the statistical properties of the distributions are similar; that is, the range of predicted values are similar due to the large range of uncertainty in stock production values. Conditions that caused model runs to be lower in the DRA relative to the No Action/No Project Alternative are related to fisheries management and the stock production curves used in Lower and Upper Klamath Basins. Due to the fishery control rule, productivity of the stock is optimal in almost all years. This occurs because the fishery management ensures that the spawning stock that produces maximum sustainable yield (Smsy) returns to spawn whenever the escapement in the absence of fishing is greater than Smsy. This statement of optimal productivity is not true for the DRA for 2 reasons: 1) Smsy is greater for the DRA due to additional habitat, which is not incorporated into fishery management; and 2) the	Yes

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	target escapement by the fishery is combined for the lower and Upper Klamath Basin; the escapement is too low for the Lower Klamath Basin and too high for the Upper Klamath Basin (or vice versa). Thus there are some years and some model iterations when the combined (suboptimal) production from the Lower Klamath Basin and Upper Klamath Basin is less than the optimal production under the No Action/No Project Alternative. Text has been added to Section 3.3.4 of the Final EIS/EIR to further explain these results from the EDRRA Model.	
AO_LT_1230_071-221	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather then on the analysis presented in the EIS/EIR. The EIS/EIR does conclude that Chinook salmon populations are likely to increase, perhaps substantially, as a result of the Proposed Action. The median values were used because the distributions that describe the uncertainty were not symmetric. As a result, the median was a better metric for describing the central portion of the distribution than the mean value. Text has been added to Section 3.3.4 of the Final EIS/EIR to clarify the reason for the use of median versus mean values in the EDRRA model.	Yes
AO_LT_1230_071-222	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather than on the analysis presented in the EIS/EIR. The Liermann et al. (2010) report was the most comprehensive analysis of Chinook populations at the time of the model development; thus, it was used to reflect uncertainty in the productivity of Chinook populations for the Upper Klamath Basin. It is beyond the scope of this study to attempt to understand how different stocks used by Liermann et al. (2010) may affect their study results. The Lead Agencies are not required to conduct every test or perform all research, study, and experimentation recommended by comment authors or address issues that are not significant to the action in question. (CEQA Guidelines, § 15204(b); NEPA Regulation 40 CFR 1500.1(b)).	No
AO_LT_1230_071-223	While the existence of UKL is an important component to the Upper Klamath Basin, the effects of UKL on Chinook stocks are unknown. While the potential effect of UKL could be discussed in a qualitative fashion, there was little quantitative information to be	No

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	included in the EDRRA Model. Moreover, the Lead Agencies are not required to conduct every test or perform all research, study, and experimentation recommended by comment authors or address issues that are not significant to the action in question. (CEQA Guidelines, § 15204(b); NEPA Regulation 40 CFR 1500.1(b)). Regarding the historical importance of Upper Klamath Lake as a rearing area for salmon, estimates by Huntington (2006) and Dunsmoor and Huntington (2006) address this issue but do not fully account for the historical (and unknown) production potential of Upper Klamath Lake itself, which could have been considerable. A recent experimental reintroduction into Upper Klamath Lake suggests that habitat here would continue to support Chinook salmon (Maule et al. 2009). To assess what this might mean for reintroduced salmon, Iron Gate Chinook salmon stock were tested in Upper Klamath Lake and the lower Williamson River to assess whether current conditions would physiologically impair Iron Gate Hatchery Chinook salmon reintroduced into the Upper Klamath Basin. Juvenile Chinook salmon were tested in cages in Upper Klamath Lake and the Williamson River in 2005 and 2006. These juveniles showed normal development as smolts in Upper Klamath Lake and survived well in both locations. This evidence (documented in Section 3.3.4.3 of the Draft EIS/EIR) strongly suggests that Upper Klamath Lake habitat is suitable to support salmonids for at least the October through May period. The authors concluded that there was little evidence of physiological impairment or significant vulnerability to C. shasta (a fish parasite) that would preclude this stock from being reintroduced into the Upper Klamath Basin. The life history of fall-run Chinook salmon generally does not include a freshwater phase from June through September. Thus, conditions for fall-run Chinook migration through Upper Klamath Lake appear favorable. Due to the timing of the migration period for spring-run Chinook salmon and steelhead, these runs would generally avoid the period of poor water quality in Upper Klamath Lake. Spring inputs in the Williamson River and on the west side of Upper Klamath Lake would likely provide thermal habitat for these year round life histories.	
AO_LT_1230_071-224	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather than on the analysis presented in the EIS/EIR. The analysis conducted by Lindley and Davis (2010) indicates that the Klamath Basin is similar to other spring Chinook streams	No

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	throughout the Pacific Northwest. Liermann et al. (2010) also utilized a representative sample of Pacific Northwest streams to conduct their analysis.	
AO_LT_1230_071-225	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather then on the analysis presented in the EIS/EIR. The model was developed for the time period 2012 to 2061; thus, the KBRA actions were assumed to start in 2012. It is important to note that the model was developed to make relative comparisons between the Proposed Action and No Action and are not absolute predictions of abundance. Thus KBRA actions are implemented relative to the No Action baseline.	No
AO_LT_1230_071-226	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather then on the analysis presented in the EIS/EIR. Hatchery fish were assumed to return to the hatchery; therefore, hatchery fish did not provide any natural production in the EDRRA model. Text has been added to Section 3.3.4 of the EIS/EIR clarifying the assumptions related to Chinook salmon mitigation releases from Iron Gate Hatchery under the Proposed Action.	No
AO_LT_1230_071-227	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather then on the analysis presented in the EIS/EIR. The model tracks the numbers of hatchery fish; however, the escapement estimates are based on natural origin fish, which is consistent with the existing fishery management of the Klamath River. The EDRRA model assumed that hatchery production is not limited by hatchery returns. Hatchery fish are captured in the fishery as part of the catch, and the remaining fish return to the hatchery. Hatchery fish do not enter into any of the fishery management decisions, so they were not tracked explicitly. Text has been added to Section 3.3.4 of the EIS/EIR clarifying the assumptions related to Chinook salmon mitigation releases from Iron Gate Hatchery under the Proposed Action.	Yes
AO_LT_1230_071-228	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather than on the analysis presented in the EIS/EIR.	No

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	The hatchery production was modeled to reflect the general release size and survival rates of hatchery releases. Increasing the survival rate of a portion of the Iron Gate hatchery fish would likely increase the hatchery component of the catch under the NAA. Because the differences between the NAA and DRA occur in the loss of the Iron Gate Hatchery, one might expect an average increase in the Iron Gate hatchery component of the catch on the order of 14 percent to 25 percent. Iron Gate Hatchery survival is less than Trinity River Hatchery, however, so these values would have to be discounted to arrive at an overall increase in hatchery fish vulnerable to the fishery. Benefits of yearling releases would be further complicated by the level of harvest, which would depend on natural escapement estimates.	
AO_LT_1230_071-229	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather than on the analysis presented in the EIS/EIR. As stated in the comment, the EDRRA model assumes that productivity values for habitats upstream of UKL are comprised of a mixture of both stream and ocean type life history strategies. The proportion of the population that is assumed to be stream type versus ocean type is drawn at random for each iteration and year simulated in the model. For purposes of harvest management the model relies on the existing fishery control rule established by the Pacific Fishery Management Council (PFMC). Specific fishery control rules for spring run Chinook salmon have not been developed therefore, differences in vulnerability between spring run and fall run life history strategies with in the fishery could not be simulated. Harvest of spring run Chinook salmon would likely be included in the current harvest estimates to the extent that spring run Chinook salmon are currently harvested under the current management regime and therefore may be implicitly incorporated into EDRRA results. Without knowing the differences in vulnerability of spring versus fall Chinook, the concerns expressed in this comment are difficult to quantify.	No
AO_LT_1230_071-230	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather than on the analysis presented in the EIS/EIR. In determining the amount of habitat associated with the various Chinook salmon populations for which there were data, Lindley and Davis (2011) excluded man-made blockages (ie: areas behind dams), but not naturally inaccessible portions of the watersheds. For the Klamath above Iron Gate Dam, portions of watersheds thought to be naturally inaccessible were not	No

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AO_LT_1230_071-231	excluded, but entire watersheds that may have historically contained salmon (e.g., the Lost River basin) were excluded. This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather then on the analysis presented in the EIS/EIR. The number of potential fish returning to the Upper Basin (i.e., escapement in the absence of fishing) is affected by the fishery. The fishery management does not have a method of separating Upper from Lower Basin fish. As a result, the number of fish returning the Upper Basin reflects the F-control rule based on mixed Upper Basin and Lower Basin Chinook. To make comparisons between the production under the No Action and the Proposed Action, the escapement in the absence of fishing provides a better metric of the relative production under each action.	No
AO_LT_1230_071-232	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather then on the analysis presented in the EIS/EIR. The EDRRA report explains that the rationale for modeling KBRA actions was to reflect an unknown process of habitat improvement; therefore, the 25% (by 2061) truncation of the lower productivity values was an ad-hoc estimate of the level of improvement due to KBRA. The distribution of productivity values over time was presented in Figure 9. The productivity distributions used in the EDRRA model were constructed by two methods: 1) fitting to historical spawner escape data for the Klamath River, thus they are directly applicable to the Klamath River and 2) the Liermann et al. (2010) analysis which incorporated multiple stocks spanning the Pacific Northwest. If future versions of the report are constructed, the addition of tables in an appendix would be beneficial to the reader.	No
AO_LT_1230_071-233	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather then on the analysis presented in the EIS/EIR. The EDRRA model was not developed to be tributary specific; thus the Trinity River cannot be separated from other tributaries. As a result, the KBRA effects were applied to the Trinity River, however the effect of incorporating KBRA in the Trinity was likely small given the uncertainty in the stock production functions (See Figure 10 in Hendrix N, 2011).	Yes

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	Moreover, even though KBRA actions are not specifically targeted to occur within the Trinity River Basin, there is a major ongoing habitat restoration program within that watershed, The Trinity River Restoration Program, which includes many restoration actions that would likely be similar in nature to those anticipated to occur under Part III, Fisheries Program, in the KBRA. A full description of the assumptions and model parameters that comprise the EDRRA model are presented in Hendrix (2011). Additional text has been added to Section 3.3.4 of the Draft EIS/EIR clarifying that the results of the EDRAA model represent Chinook salmon population responses for the entire Klamath Basin and was not developed to be tributary specific.	
AO_LT_1230_071-234	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather then on the analysis presented in the EIS/EIR. Currently a harvest rate is defined for the entire Klamath. The EDRRA model assumed that fisheries management would continue with these methods, and distinguishing among Lower Basin or Upper Basin Chinook would not be possible prior to setting annual harvest rates. The Lead Agencies are not required to conduct every test or perform all research, study, and experimentation recommended by comment authors or address issues that are not significant to the action in question. (CEQA Guidelines, § 15204(b); NEPA Regulation 40 CFR 1500.1(b)).	No
AO_LT_1230_071-235	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather then on the analysis presented in the EIS/EIR. The EDRRA model is consistent with STT (2005), because the modelers used the data provided in STT (2005) for the observed data in their statistical model. The STT (2005) indicate that the model is for Fall Chinook, thus the modelers used that assumption to derive the water shed area estimates. There are several factors that differ between the STT (2005) estimate and the EDRRA modeling results that hinder comparison: 1) The STT (2005) makes an estimate of unfished equilibrium population size using Parken et al. (2006), which is a different analysis than Liermann et al. (2010); and 2) the EDRRA modelers do not know how the estimate of watershed size used in STT (2005) was derived, whereas the modelers do understand how the estimate provided by D. Chow was obtained.	No

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AO_LT_1230_071-236	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather than on the analysis presented in the EIS/EIR. In determining the amount of habitat associated with the various Chinook salmon populations for which there were data, Lindley and Davis (2011) excluded man-made blockages (ie: areas behind dams), but not naturally inaccessible portions of the watersheds. For the Klamath above Iron Gate Dam, portions of watersheds thought to be naturally inaccessible were not excluded, but entire watersheds that may have historically contained salmon (e.g., the Lost River basin) were excluded. A full description of the assumptions and model parameters that comprise the EDRRA model are presented in Hendrix (2011).	No
AO_LT_1230_071-237	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather than on the analysis presented in the EIS/EIR. Hatchery production does not contribute to natural production in the EDRRA model. Text has been added to Section 3.3 of the EIS/EIR clarifying the assumptions related to Chinook salmon mitigation releases from Iron Gate Hatchery under the Proposed Action.	Yes
AO_LT_1230_071-238	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather than on the analysis presented in the EIS/EIR. Exploring the nuances of harvest management was beyond the scope of the EDRRA model; however within the EDRRA model, the population is being managed optimally under the No Action, whereas it is being managed sub-optimally under Proposed Action. The management of natural production could be improved by using a Fishery Control Rule that was tailored to the production potential available under the Proposed Action. Such a management change would likely increase EDRRA model predictions of catches and escapement under the Proposed Action. The Lead Agencies are not required to conduct every test or perform all research, study, and experimentation recommended by comment authors or address issues that are not significant to the action in question. (CEQA Guidelines, § 15204(b); NEPA Regulation 40 CFR 1500.1(b)).	No
AO_LT_1230_071-239	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather than on the analysis presented in the EIS/EIR.	Yes

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	The numbers behind these estimates provided are the annual values for each model iteration (details presented in Hendrix (2011) Appendix B). They are useful for making relative comparisons of performing the No Action/No Project Alternative versus Proposed Action. The timing of changes in fish abundances could potentially be discussed qualitatively; however the probabilities are fairly consistent over an approximately 40 years suggesting robust relative benefits over this time period. Text has been added to Section 3.3 of the Draft EIS/EIR clarifying the assumptions related to Chinook salmon mitigation releases from Iron Gate Hatchery under the Proposed Action. The Lead Agencies are not required to conduct every test or perform all research, study, and experimentation recommended by comment authors or address issues that are not significant to the action in question. (CEQA Guidelines, § 15204(b); NEPA Regulation 40 CFR 1500.1(b)).	
AO_LT_1230_071-240	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather than on the analysis presented in the EIS/EIR. The probability of Proposed Action being greater than the No Action/No Project Alternative was determined by calculating the number of Monte Carlo simulations in which the Proposed Action was greater than the No Action/No Project Alternative; therefore, this metric integrates across the uncertainty in the Monte Carlo simulation values. The goal was to provide a metric that described the relative benefits of the Proposed Action to the No Action/No Project Alternative. The results are sensitive to the harvest policy as described in the EDRRA report (Hendrix 2011). Measurements of uncertainty are presented in Hendrix (2011) and copies of the report are available to the public at the klamathrestoration.gov web site. Additional text has been added to Section 3.3.4 of the Draft EIS/EIR describing the harvest policy used in the EDRRA model and the possible implications of that policy to the results.	Yes
AO_LT_1230_071-241	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather than on the analysis presented in the EIS/EIR. The modelers were not aware of a 50 percent difference in productivity between the lower and Upper Klamath Basin. Still, the EDRRA model assumed an active reintroduction strategy as outlined by Oregon Department of Fish and Wildlife (ODFW) (Hooton and Smith 2008). The management action of reducing harvest was not modeled in EDRRA because of the uncertainties in modeling such a Pacific Fisheries Management Council	Yes

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	process. The PFMC was established by the Magnuson Fishery Conservation and Management Act of 1976 and has regulatory jurisdiction over salmon fishing within the 317,690 square mile exclusive economic zone from 3 miles to 200 miles off the coast of Washington, Oregon and California. Jurisdiction over commercial and recreational salmon fishing regulations in nearshore areas, within 3 miles of shore, lies with the respective states. However, the states generally adopt regulations consistent with those established by the PFMC. The Salmon Fishery Management Plan developed by the PFMC describes the goals and methods for salmon management. Management tools such as season length, quotas, and bag limits vary depending on how many salmon are present. There are two central parts of the Plan: Conservation objectives, which are annual goals for the number of spawners of the major salmon stocks (“spawner escapement goals”), and allocation provisions of the harvest among different groups of fishers (commercial, recreational, tribal, various ports, ocean, and inland). The Council must also comply with laws such as the Endangered Species Act. Since the management of salmon considers many factors that can fluctuate greatly from year to year (population abundance and environmental conditions) it is impossible to predict how future management decisions regarding the specific harvest of Klamath Basin salmon might change as a result of the Proposed Action. Given these uncertainties, the EDRRA Chinook salmon life cycle model developed Hendrix (2011) assumes that current management rules (fishery control rule) established by the PFMC for management of Klamath River Chinook salmon would remain in place throughout the fifty year period of analysis. Text has been added to Section 3.3 of the Draft EIS/EIR further clarifying the assumptions of the model regarding the use of the current fishery control rule.	
AO_LT_1230_071-242	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather than on the analysis presented in the EIS/EIR. The production functions for the Upper Klamath Basin and Lower Klamath Basin are different. The productivity and capacity parameters of the basin-specific Ricker function are derived from two different sources of information. The Lower Klamath Basin	Yes

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	parameters were estimated statistically, whereas the Upper Klamath Basin was calculated using the Liermann et al. (2010) estimates. As stated in the EDRRA report (Hendrix 2011), the harvest is determined based on a fishery control rule (Appendix A) and deterministic calculations of harvest based on the KHRM model. Text has been added to Section 3.3.4 of the Draft EIS/EIR further clarifying the assumptions of the model regarding the use of the current fishery control rule.	
AO_LT_1230_071-243	This comment is specific to analysis contained in a technical report cited in the EIS/EIR rather than on the analysis presented in the EIS/EIR. The harvest management is governed largely by the F-control rule. The F control rule was recently amended to reduce the chance for fishery closure by allowing the PFMC to make determinations of closure, rather than allowing the F-control rule to force a closure. It is likely that the F-control rule would continue to be amended as additional information on the stock is collected. Text has been added to Section 3.3 of the EIS/EIR further clarifying the assumptions of the model regarding the use of the current fishery control rule.	No
AO_LT_1230_071-244	The Current Effects Background Technical Report (DOI 2012a) has been revised via errata to remove the indication that the PacifiCorp dams have been identified by scientific analysis as a contributing factor to the 2002 fish die off. In Current Effects Background Technical Report (DOI 2012a) on p. 1-8, DOI through errata and this comment response deletes the last sentence related to 2002 fish kill	Yes
AO_LT_1230_071-245	As part of the study for the Current Effects Background Technical Report (DOI 2012a), government-to-government consultations were conducted with the six basin tribes to solicit input from the tribal governments regarding their assessment of effects on Indian trust resources, tribal rights to take those resources, other resources traditionally used by tribes, and cultural values related to those resources and rights within the study area resulting from the current operations of the four PacifiCorp dams on the Klamath River. Descriptions of tribal history, cultural practices, religious practices, oral traditions and health impacts are general and reflect Tribal perspectives on resource issues. In reporting the effects of current dam operations on the respective tribes, DOI tempered the tribal perspective by	No

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	providing context and background information from the FERC Final EIS for Hydropower License: Klamath Hydroelectric Project (FERC Project No. 2082-027), provided an overview of the cultural history of the region. The North Coast Regional Water Quality Control Board's Basin Plan for the Klamath River was relied on for characterizing Klamath mainstem water quality, and the NOAA Fisheries Service's Klamath River Basin 2010 Report to Congress was relied on to characterize the general condition of the Klamath River and some agency responses to arrest declining fish populations. The Yurok Tribe Fishery Program's The Klamath River Fish Kill of 2002: Analysis of Contributing Factors provided a synopsis of the historic lower Klamath salmon die-off of 2002, and Kari Norgaard's "The Effects of Altered Diet on the Health of the Karuk People: A Preliminary Report" provided localized information substantiating the larger national trend of loss of traditional foods, increased Indian Tribe health-related problems, and the related demise of traditional culture. Quantifiable data on Project effects to water, aquatic, and terrestrial resources are found in Sections 3.2, 3.3, 3.4, and 3.5. To clarify the process used to develop the Current Effects Background Technical Report and Potential Effects Background Technical Report language has been added to Section 3.12, as well as, Table 3.12-1 through Table 3.12-6. Minimum flow releases from Iron Gate Dam have been governed by NOAA Fisheries Service BO requirements since 2000. Prior to NOAA Fisheries' flow requirements, PacifiCorp, under a long term agreement with Reclamation, has operated Link River Dam in coordination with PacifiCorp's other five dams. Prior to 2000, PacifiCorp operated the six dams for power production in accordance with FERC requirements and to ensure adequate water supplies for Reclamation's Klamath Project during the irrigation season. By themselves, the lower four PacifiCorp Dams do not affect flow volumes on a monthly, seasonal, or annual basis. Those flow volumes are mostly affected by releases from Link River Dam, agricultural diversions and returns below Link River Dam, and inflows from groundwater and tributaries between Link River Dam and Iron Gate Dam. On a shorter time frame (e.g. hourly to multi-day), however, the coordinated management of the hydroelectric project (including Link River Dam) has altered flows by decreasing natural flow variability below Iron Gate Dam.	
AO_LT_1230_071-246	The effect of dams on sediment transport processes as noted by the footnote to Table 3-1 in the DOI 2012a are muted by time and distance from Iron Gate Dam. However attenuation of sediment transport process are influenced by localized precipitation patterns in the tributaries and mainstem Klamath River, as well	No

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	as, distance from Iron Gate Dam. For example heavy precipitation in the mainstem Klamath during periods of dry conditions on the tributary streams make broad statements on the relative importance of sediment transport from these sources difficult to clearly discern. Also inherent in the evaluation of current influence of dam operations is that by blocking the upstream sediment transport, peak flows on the mainstem Klamath river have been dampened and delayed and all movement of sediment, course grained, fine-grained, and otherwise, have been completely halted by the dams themselves; thereby requiring the Lead Agencies to depend on model data to establish the full extent of this effect. The technical report takes the conservative approach that the dams reduce the bedload sediment transfer. This conservative approach is warranted given the variability of precipitation events and modeling uncertainty and supported by both PacifiCorp (2004) Water Resources Technical Report and FERC (2007).	
AO_LT_1230_071-247	As part of the study for the Current Effects Background Technical Report, government-to-government consultations were conducted with the six basin tribes to solicit input from the tribal governments regarding their assessment of effects on Indian trust resources, tribal rights to take those resources, other resources traditionally used by tribes, and cultural values related to those resources and rights within the study area resulting from the current operations of the four PacifiCorp dams on the Klamath River. Descriptions of tribal history, cultural practices, religious practices, oral traditions and health impacts are general and reflect Tribal perspectives on resource issues. In reporting the effects of Current Dam operations on the respective tribes and tribal resources, DOI tempered the tribal perspective by providing context and background information from the FERC Final EIS for Hydropower License: Klamath Hydroelectric Project (FERC Project No. 2082-027), provided an overview of the cultural history of the region. The North Coast Regional Water Quality Control Board's Basin Plan for the Klamath River was relied on for characterizing Klamath mainstem water quality, and the NOAA Fisheries Service's Klamath River Basin 2010 Report to Congress was relied on to characterize the general condition of the Klamath River and some agency responses to arrest declining fish populations. The Yurok Tribe Fishery Program's The Klamath River Fish Kill of 2002: Analysis of Contributing Factors provided a synopsis of the historic lower Klamath salmon die-off of 2002, and Kari Norgaard's "The Effects of Altered Diet on the Health of the Karuk People: A Preliminary Report" provided localized	No

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	information substantiating the larger national trend of loss of traditional foods, increased Indian Tribe health-related problems, and the related demise of traditional culture. Quantifiable data on Project effects to water, aquatic, and terrestrial resources are found in Sections 3.2, 3.3, 3.4, and 3.5. To clarify the process used to develop the Current Effects Background Technical Report and Potential Effects Background Technical Report language has been added to Section 3.12, as well as, Table 3.12-1 through Table 3.12-6. Minimum flow releases from Iron Gate Dam have been governed by NOAA Fisheries Biological Opinion requirements since 2000. Prior to NOAA Fisheries flow requirements, PacifiCorp, under a long term agreement with Reclamation, has operated Link River Dam in coordination with PacifiCorp's other five dams. Prior to 2000, PacifiCorp operated the six dams for power production in accordance with FERC requirements and to ensure adequate water supplies for Reclamation's Klamath Project during the irrigation season. By themselves, the lower four PacifiCorp Dams do not affect flow volumes on a monthly, seasonal, or annual time frame. Those flow volumes are mostly affected by releases from Link River Dam, agricultural diversions and returns below Link River Dam, and inflows from groundwater and tributaries between Link River Dam and Iron Gate Dam. On a shorter time frame (e.g., hourly to multi-day), however, the coordinated management of the hydroelectric project (including Link River Dam) has altered flows by decreasing natural flow variability below Iron Gate Dam. More natural flow variability can be important for ecosystem functions and may decrease the prevalence of juvenile salmon disease. Dam removal and implementation of KBRA would allow more flexibility in managing flows in the river below the Iron Gate Dam site, particularly for creating more short-term natural flow variability and periodic higher-flows. The KBRA Environmental Water program includes the "production" of more water to be managed in real time in order to maximize benefits for the Klamath Basin's fish. In addition, real time management (shaping) of the hydrograph below the location of Iron Gate Dam is difficult with the presence of the four lower Klamath dams owing to constraints on dam releases (penstock capacity, variable water levels in reservoirs, and elevation of dam overflows), delays and peak-flow dampening as water moves through the reservoirs, and hydropower generation considerations which would not be a factor in water management without the dams.	

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AO_LT_1230_071-248	As part of the study for the Current Effects Background Technical Report, government-to-government consultations were conducted with the six basin tribes to solicit input from the tribal governments regarding their assessment of effects on Indian trust resources, tribal rights to take those resources, other resources traditionally used by tribes, and cultural values related to those resources and rights within the study area resulting from the current operations of the four PacifiCorp dams on the Klamath River. Descriptions of tribal history, cultural practices, religious practices, oral traditions and health impacts are general and reflect Tribal perspectives on resource issues. In reporting the effects of Current Dam operations on the respective tribes and tribal resources, DOI tempered the tribal perspective by providing context and background information from the FERC Final EIS for Hydropower License: Klamath Hydroelectric Project (FERC Project No. 2082-027), provided an overview of the cultural history of the region. The North Coast Regional Water Quality Control Board's Basin Plan for the Klamath River was relied on for characterizing Klamath mainstem water quality, and the NOAA Fisheries Service's Klamath River Basin 2010 Report to Congress was relied on to characterize the general condition of the Klamath River and some agency responses to arrest declining fish populations. The Yurok Tribe Fishery Program's The Klamath River Fish Kill of 2002: Analysis of Contributing Factors provided a synopsis of the historic lower Klamath salmon die-off of 2002, and Kari Norgaard's "The Effects of Altered Diet on the Health of the Karuk People: A Preliminary Report" provided localized information substantiating the larger national trend of loss of traditional foods, increased Indian Tribe health-related problems, and the related demise of traditional culture. Quantifiable data on Project effects to water, aquatic, and terrestrial resources are found in Sections 3.2, 3.3, 3.4, and 3.5. To clarify the process used to develop the Current Effects Background Technical Report and Potential Effects Background Technical Report language has been added to Section 3.12 as well as to Table 3.12-1 through Table 3.12-6. Flow releases from Iron Gate Dam have been governed by NOAA Fisheries Biological Opinion requirements since 2000. Prior to NOAA Fisheries flow requirements, PacifiCorp, under a long term agreement with Reclamation, has operated Link River Dam in coordination with PacifiCorp's other five dams. Prior to 2000, PacifiCorp operated the six dams for power production and in accordance with FERC requirements and to ensure adequate water supplies for Reclamation's Klamath Project during the	No

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	irrigation season. On a shorter time frame (e.g. hourly to multi-day), however, the coordinated management of the hydroelectric project (including Link River Dam) has altered flows by decreasing natural flow variability below Iron Gate Dam. More natural flow variability can be important for ecosystem functions and may decrease the prevalence of juvenile salmon disease. Dam removal and implementation of KBRA would allow more flexibility in managing flows in the river below the Iron Gate Dam site, particularly for creating more short-term natural flow variability and periodic higher-flows. The KBRA Environmental Water program includes the "production" of more water to be managed in real time in order to maximize benefits for the Klamath Basin's fish. In addition, real time management of the hydrograph below the location of Iron Gate Dam is difficult with the presence of the four lower Klamath dams owing to constraints on dam releases (penstock capacity, variable water levels in reservoirs, and height of dam overflow), delays and peak-flow dampening as water moves through the reservoirs, and hydropower generation considerations which would not be a factor without the dams. Increasing "bedload/sediment transfer", which includes more high flow events, would add gravels trapped behind these dams to stream channels below Iron Gate Dam, help break up armored stream channels below the dams, and more frequently cleanse and refresh streambeds. These processes would increase the quality and quantity of salmon spawning habitat and may decrease juvenile salmon disease by disrupting the environment that allows the intermediate hosts for disease to thrive (i.e., stable flows and stable stream substrate). Increased spawning and decreased disease would likely benefit salmon runs and tribal salmon harvest in the lower river.	
AO_LT_1230_071-249	As part of the study for the Current Effects Background Technical Report, government-to-government consultations were conducted with the six basin tribes to solicit input from the tribal governments regarding their assessment of effects on Indian trust resources, tribal rights to take those resources, other resources traditionally used by tribes, and cultural values related to those resources and rights within the study area resulting from the current operations of the four PacifiCorp dams on the Klamath River. Descriptions of tribal history, cultural practices, religious practices, oral traditions and health impacts are general and reflect Tribal perspectives (i.e., stability of river flows in the Klamath River below Iron Gate Dam is a function of hydroelectric dam operations) on resource issues.	No

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	In reporting the effects of Current Dam operations on the respective tribes and tribal resources, DOI tempered the tribal perspective by providing context and background information from the FERC Final EIS for Hydropower License: Klamath Hydroelectric Project (FERC Project No. 2082-027), provided an overview of the cultural history of the region. The North Coast Regional Water Quality Control Board's Basin Plan for the Klamath River was relied on for characterizing Klamath mainstem water quality, and NOAA Fisheries Service's Klamath River Basin 2010 Report to Congress was relied on to characterize the general condition of the Klamath River and some agency responses to arrest declining fish populations. The Yurok Tribe Fishery Program's The Klamath River Fish Kill of 2002: Analysis of Contributing Factors provided a synopsis of the historic lower Klamath salmon die-off of 2002, and Kari Norgaard's "The Effects of Altered Diet on the Health of the Karuk People: A Preliminary Report" provided localized information substantiating the larger national trend of loss of traditional foods, increased Indian Tribe health-related problems, and the related demise of traditional culture. Quantifiable data on Project effects to water, aquatic, and terrestrial resources are found in Sections 3.2, 3.3, 3.4, and 3.5. PacifiCorp (2004) Water Resources Technical Report (Hydrology chapter), PacifiCorp's 2006, FERC (2007), and Asarian et al. 2010 were utilized in the analysis in the EIS/EIR. To clarify the process used to develop the Current Effects Background Technical Report and Potential Effects Background Technical Report language has been added to Section 3.12 as well as to Table 3.12-1 through Table 3.12-6. Master Response WQ-27: Nutrient Retention With Dams, Nutrient Release Without Dams, and Periphyton. Master Response AQU-27-Disease.	
AO_LT_1230_071-250	As part of the study for the Current Effects Background Technical Report, government-to-government consultations were conducted with the six basin tribes to solicit input from the tribal governments regarding their assessment of effects on Indian trust resources, tribal rights to take those resources, other resources traditionally used by tribes, and cultural values related to those resources and rights within the study area resulting from the current operations of the four PacifiCorp dams on the Klamath River. Descriptions of tribal history, cultural practices, religious practices, oral traditions and health impacts are general and reflect Tribal perspectives on resource issues.	No

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	DOI through errata and this comment response revises the first paragraph of p. 3-45 in Indian Trust Technical Report (DOI 2012a), the sentence "Removal of Iron Gate Dam will increase the scouring effect and lower the temperature in the upper river, both of which tend to suppress the life cycle of the parasites" to state "Removal of Iron Gate Dam will increase the scouring effect and lower the temperature in the upper river primarily during the late summer and fall months, both of which tend to suppress the life cycle of the parasites.	
AO_LT_1230_071-251	The purpose of this comment period is to receive comments on the Draft EIS/EIR as opposed to comments on supporting reports and scientific studies. The comment refers to language in a supporting study. Additionally the full quote from the Hydropower Benefits Technical Report p. 12 paragraph 5 is: "Then in 2002, there was a major die-off of adult salmon returning to the Klamath River (DOI et al. undated). It was later determined that two common pathogens that are lethal to fish under stress filled about 30,000 salmon, mostly Chinook (The Nation Academies, 2007). This event brought additional attention to the Klamath Basin and the conflicts over competing uses of the basin's limited water supply" (Reclamation 2012f). This paragraph does not implicate the Klamath Hydroelectric Project in the fish die-off and in fact attributes the death of 30,000 to pathogens. No change is needed to the EIS/EIR or the technical report.	No